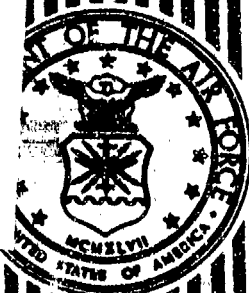


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ESL-TR-89-04

SUBSTITUTION OF WAX AND GREASE CLEANERS WITH BIO-DEGRADABLE SOLVENTS: PHASE I, PART IV

P.M. WIKOFF, R.K. SCHOBBER, T.L. HARRIS,
D.F. SUCIU, R.E. McATEE, G.S. CARPENTER,
P.A. PRYFOGLE, J.M. BELLER

EL&G IDAHO, INC.
P. O. BOX 1625
IDAHO FALLS ID 83415

SEPTEMBER 1989

FINAL REPORT

OCTOBER 1987 — SEPTEMBER 1988

DTIC
ELECTE
MAY 02 1990

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REPORT DOCUMENTATION PAGE

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2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release. Distribution unlimited.	
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			TASK NO. 71	WORK UNIT ACCESSION NO. 04
11. TITLE (Include Security Classification) Substitution of Wax and Grease Cleaners with Biodegradable Solvents, Phase I Report (UNCLASSIFIED) PART IV				
12. PERSONAL AUTHOR(S) P.M. Wikoff, R.K. Schober, T.L. Harris, D.F. Suciu, R.E. McAtee, G.S. Carpenter, P.A. Pryfogle, J.M. Beller,				
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15. PAGE COUNT 524				
16. SUPPLEMENTARY NOTATION Availability of this report is specified on reverse of front cover.				
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP		
	02		solvents, cleaners, halogenated, hydrocarbon, biodegradable, industrial wastewater, hazardous waste minimization, TABLES (DATA)	
19. ABSTRACT (Continue on reverse if necessary and identify by block number) Methods have been tested for systematic evaluations of biodegradable solvents for aircraft parts cleaning, degreasing, and masking-wax removal processes. Screening tests have identified solvents that are biodegradable, can efficiently remove soils from aircraft parts in a dip tank, and meet the military specification requirement for corrosiveness (ANSI/ASTM) in processes used at the five Air Force Air Logistics Centers (ALCs). The database developed during Phase I, of this program identifies each process, the chemicals used, tank volumes, testing requirements, and alternative chemicals. To test solvent biodegradability, an ASTM method was modified and used to test a bench-scale activated sludge system by measuring chemical oxygen demand (COD) and adenosine triphosphate (ATP) over a 6-hour period to determine if the bacteria will reduce COD to below the limit established by the National Pollution Discharge Elimination System (NPDES). Solvents were categorized to identify any trends, and six were selected for in-depth pilot-scale testing,				
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a. NAME OF RESPONSIBLE INDIVIDUAL Mr. Charles J. Carpenter			22b. TELEPHONE (Include Area Code) 904 2832942	22c. OFFICE SYMBOL HQ AFESC/RDVS

PREFACE

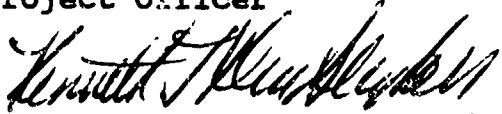
This report was prepared by Idaho National Engineering Laboratory, EG&G Idaho, Inc., P.O. Box 1625 Idaho Falls, Idaho 83415 under Contract Number DE-AC07-76ID01570 for the Air Force Engineering and Services Center (AFESC), Tyndall Air Force Base, Florida 32403-6001. Mr Charles J. Carpenter was the Government technical program manager. This report summarizes work accomplished between 1 October 1987 and 30 March 1989.

This report has been reviewed by the Public Affairs Office and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

This technical publication has been reviewed and is approved for publication.


CHARLES J. CARPENTER
Project Officer


FRANK P. GALLAGHER, Colonel, USAF
Chief, Environics Division

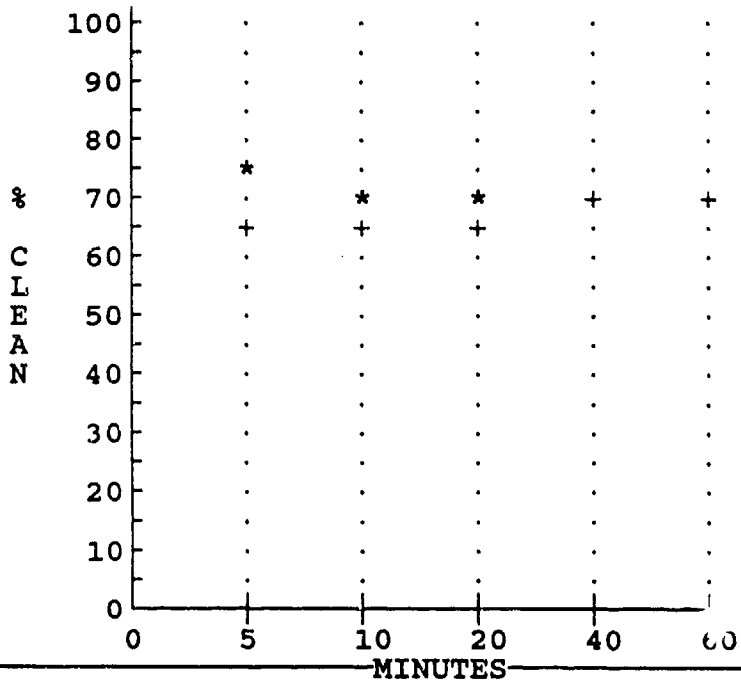

KENNETH T. DENBLEYKER, Maj, USAF
Chief, Environmental Sciences
Branch


JAMES R. VAN ORMAN
Deputy Director
Engineering and Services Laboratory

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4

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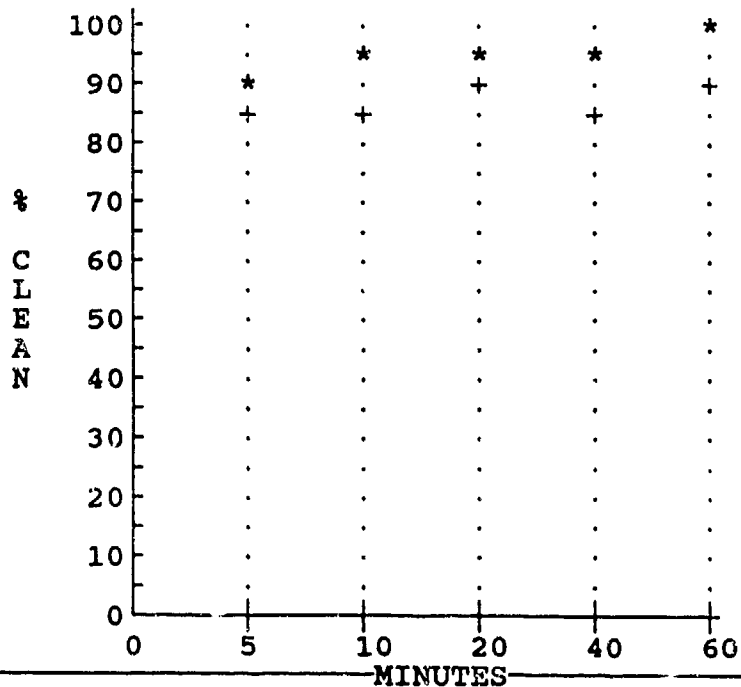
APPENDIX G
TEST DATA
(CONTINUED)



EXXON CHEMICALS
EXSOL D 80
GREASE: CONCENTRATE AT 1
20 F
INCONEL 750

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+ -- UNRINSED

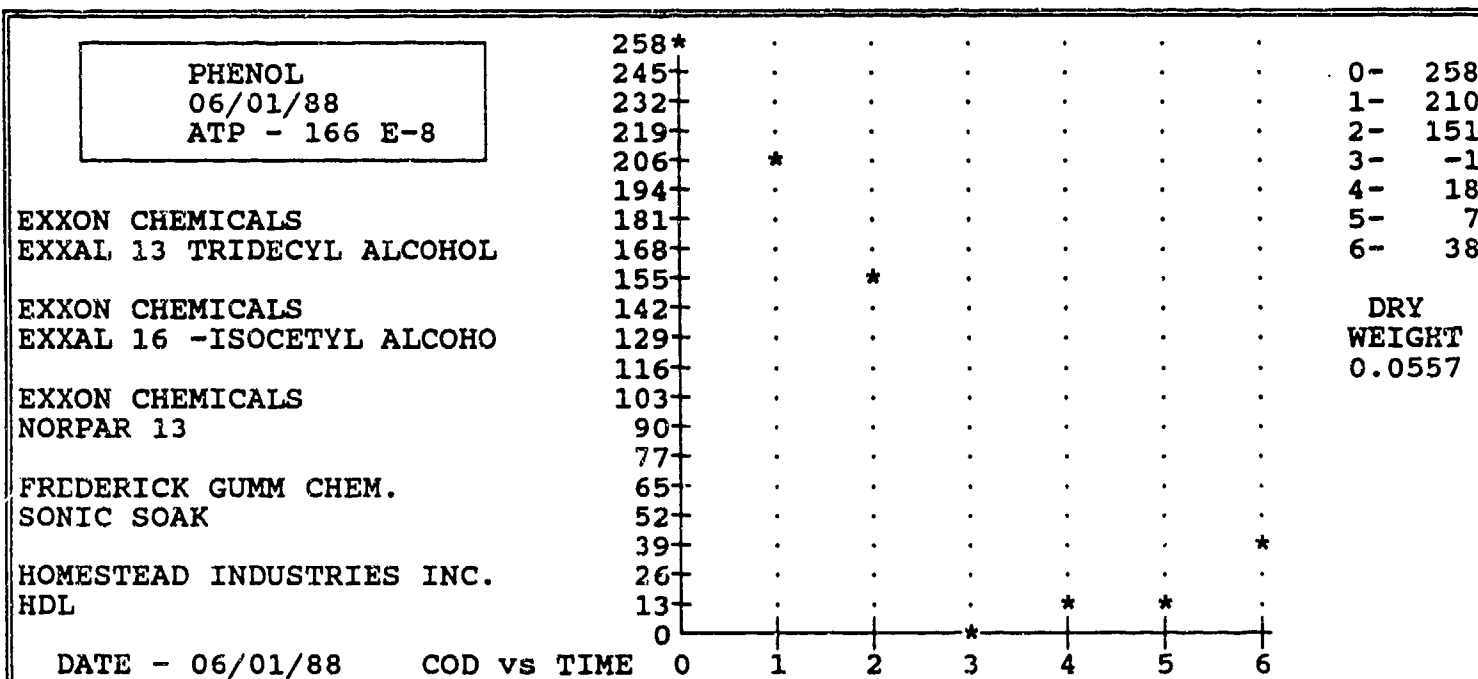
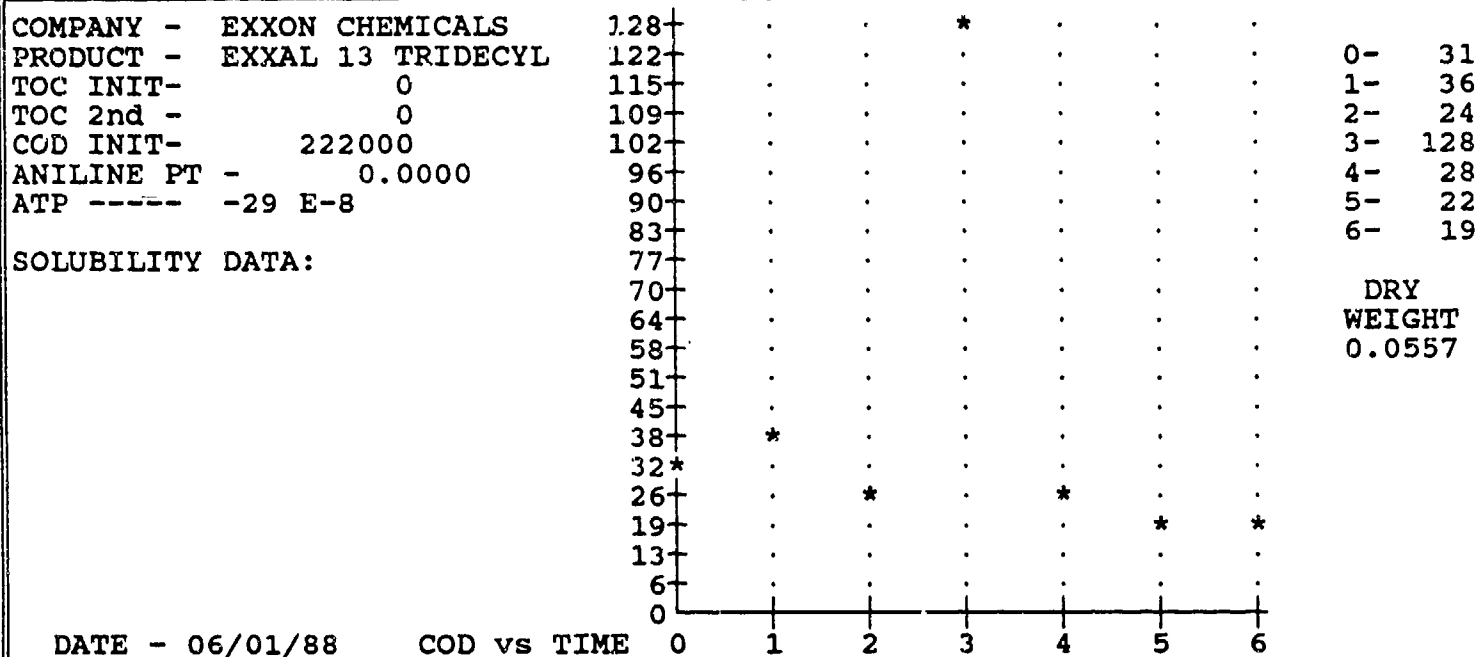
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71% 65%
70% 64%
72% 69%
71% 71%



EXXON CHEMICALS
EXSOL D 80
HYDRAULIC FLUID: CONCENTRATE AT 120 F
A12024

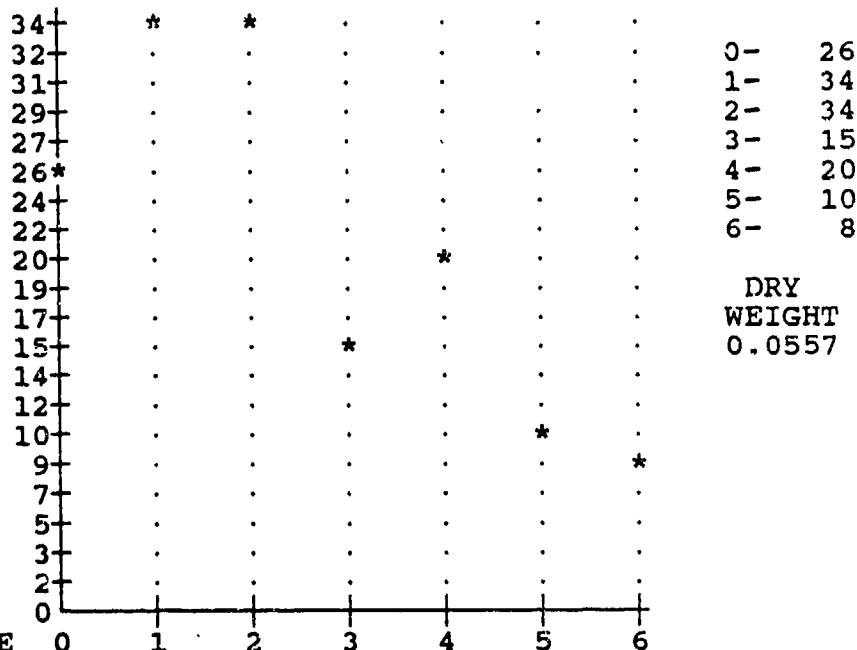
* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED
90% 87%
95% 86%
95% 92%
96% 85%
100% 90%



COMPANY - EXXON CHEMICALS
 PRODUCT - EXXAL 16 -ISOCETYL
 TOC INIT- 0
 TOC 2nd - 0
 COD INIT- 26500
 ANILINE PT - 0.0000
 ATP ----- -23 E-8

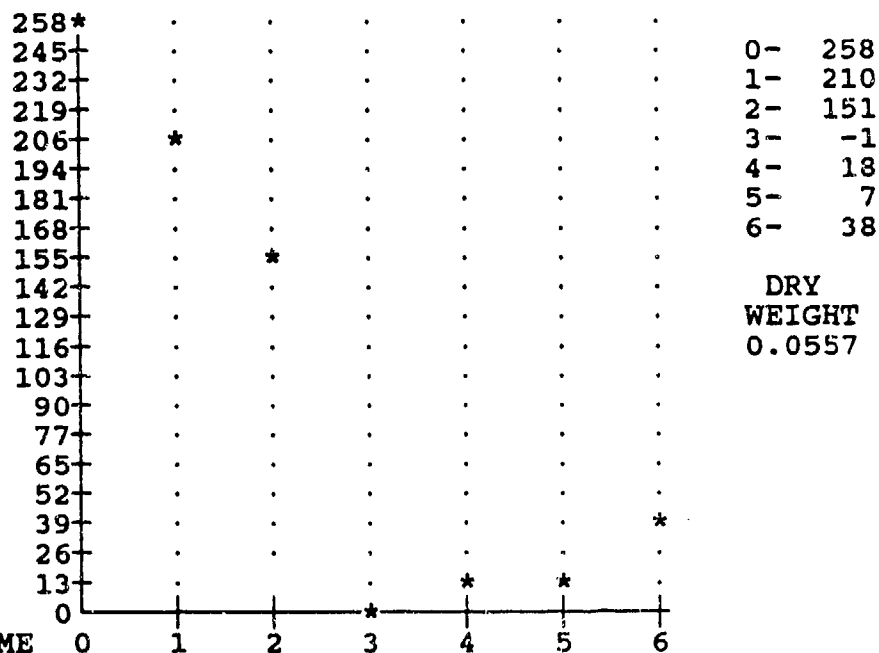
SOLUBILITY DATA:



DATE - 06/01/88

COD vs TIME

PHENOL
 06/01/88
 ATP - 166 E-8



EXXON CHEMICALS
 EXXAL 13 TRIDECYL ALCOHOL

EXXON CHEMICALS
 EXXAL 16 -ISOCETYL ALCOHO

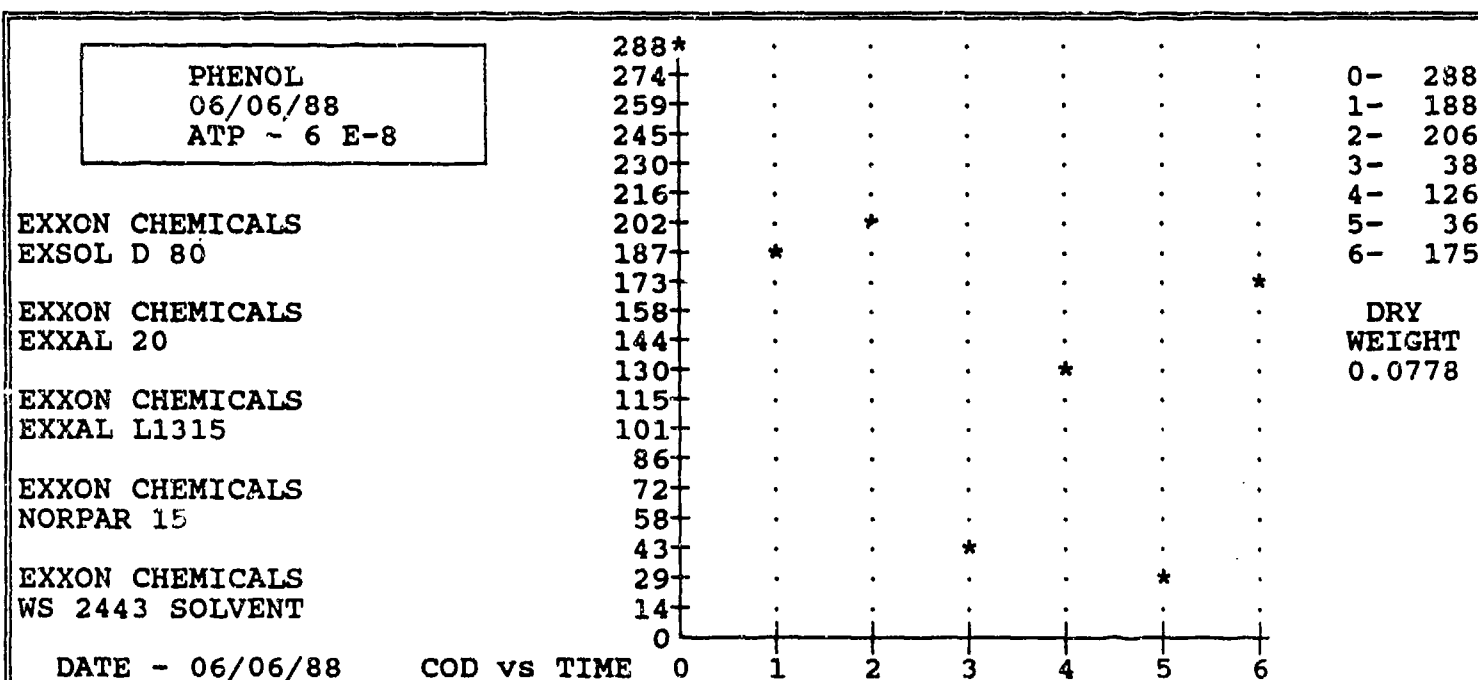
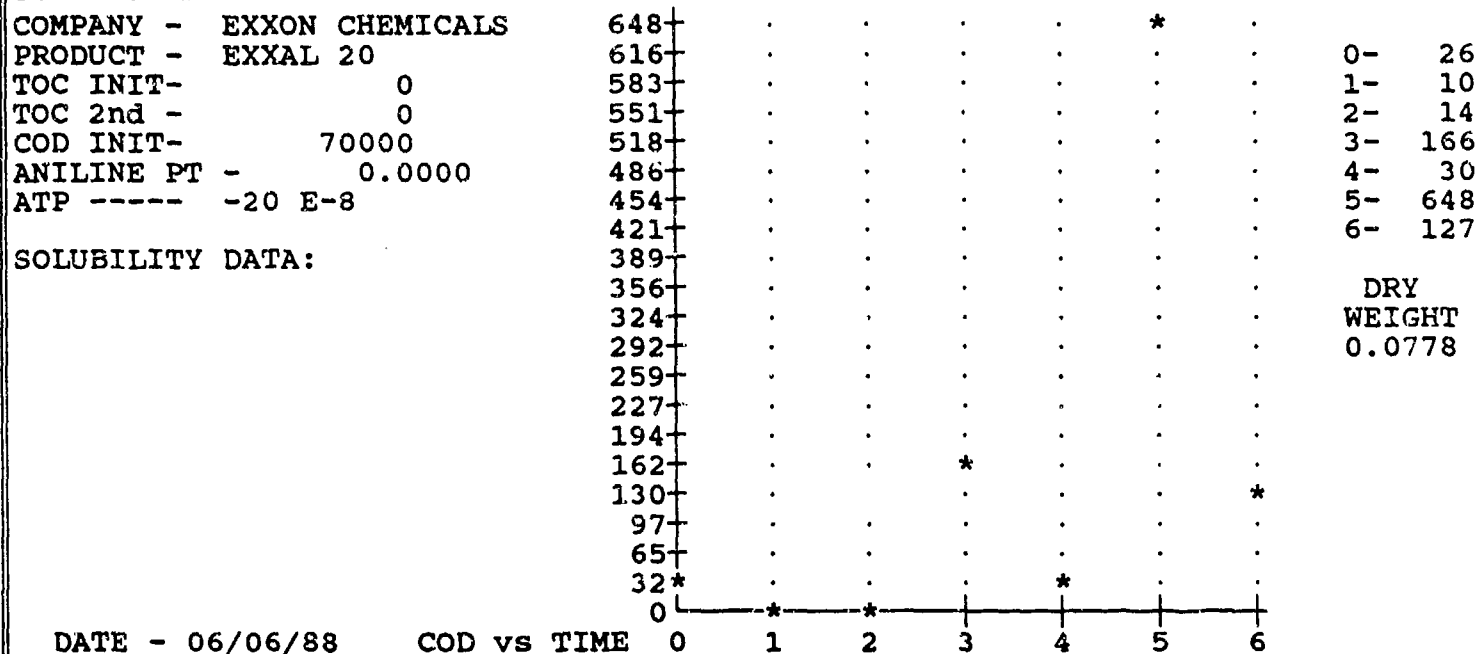
EXXON CHEMICALS
 NORPAR 13

FREDERICK GUMM CHEM.
 SONIC SOAK

HOMESTEAD INDUSTRIES INC.
 HDL

DATE - 06/01/88

COD vs TIME

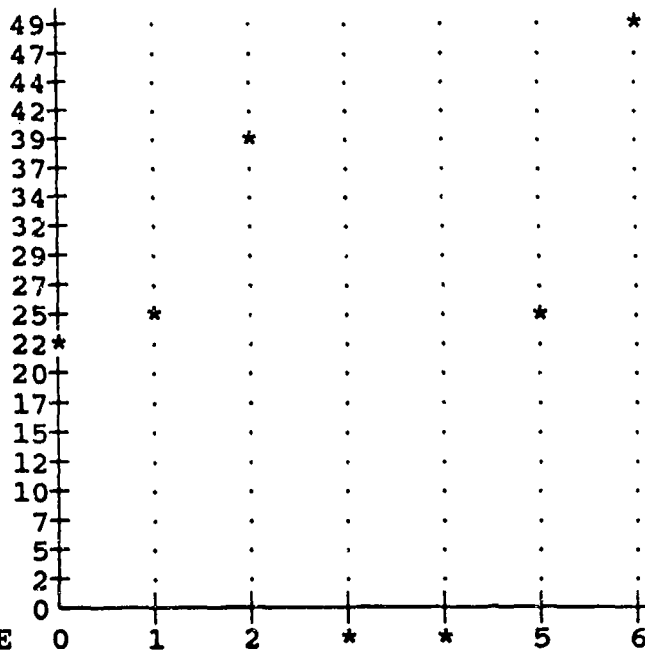


COMPANY - EXXON CHEMICALS
 PRODUCT - EXXAL 20
 TOC INIT- 0
 TOC 2nd - 0
 COD INIT- 70000
 ANILINE PT - 0.0000
 ATP ----- -9 E-8

SOLUBILITY DATA:

DATE - 09/28/88

COD vs TIME



0- 21
 1- 24
 2- 40
 3- -25
 4- -25
 5- 24
 6- 49

DRY
 WEIGHT
 0.0679

PHENOL
 09/28/88
 ATP - 65 E-8

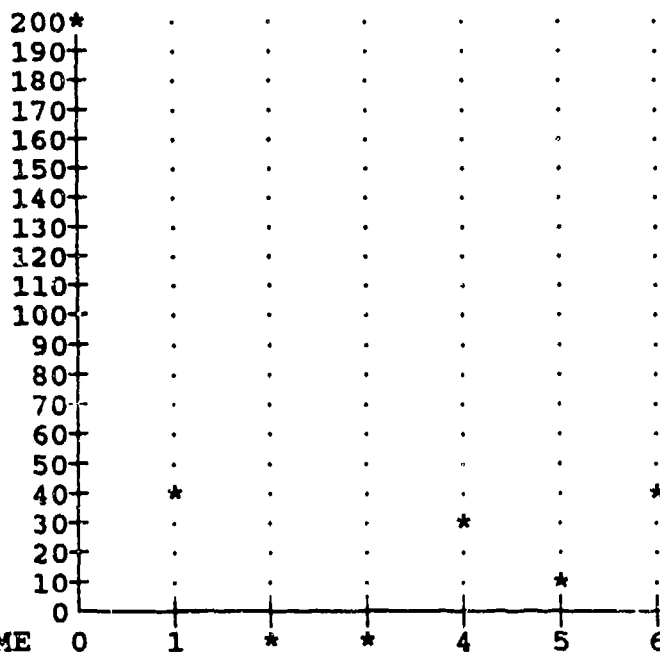
EXXON CHEMICALS
 EXSOL D 80

EXXON CHEMICALS
 EXXAL 20

JOHNSON WAX/GEM STATE PAP
 BIG BARE

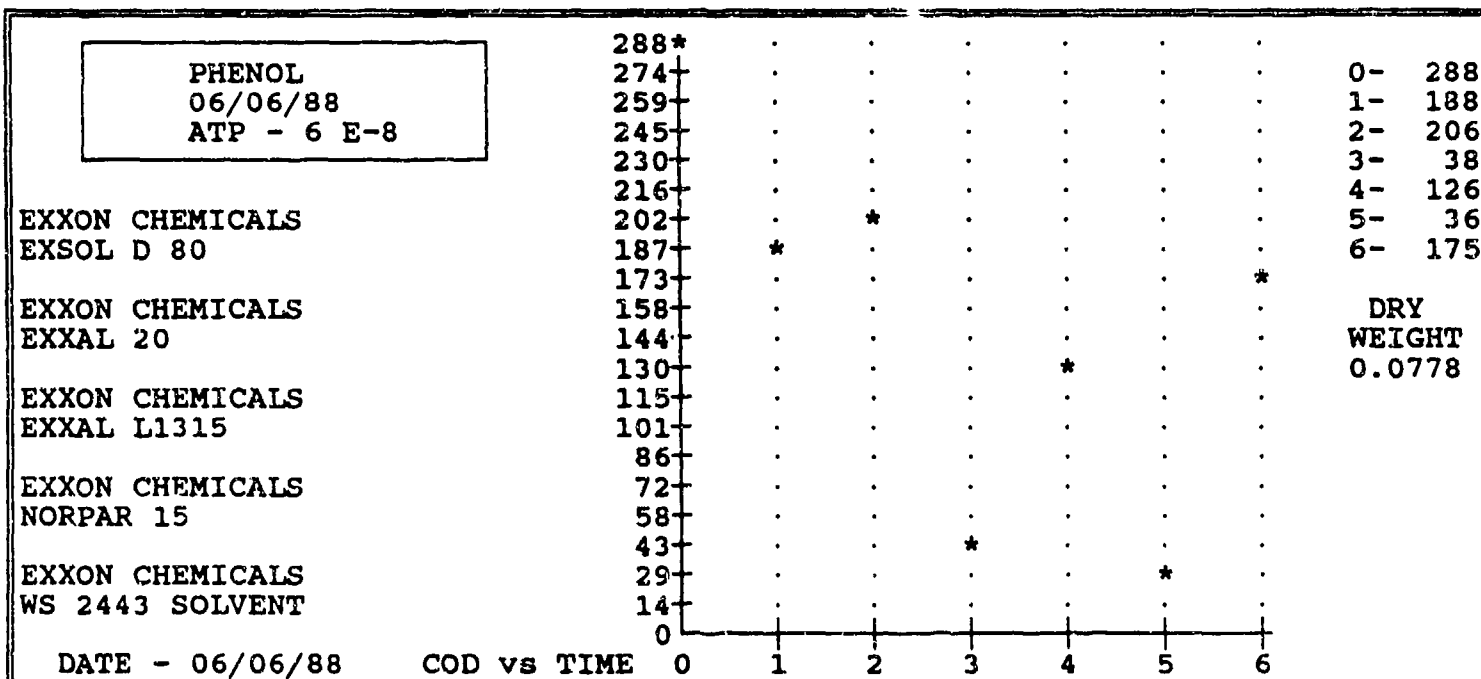
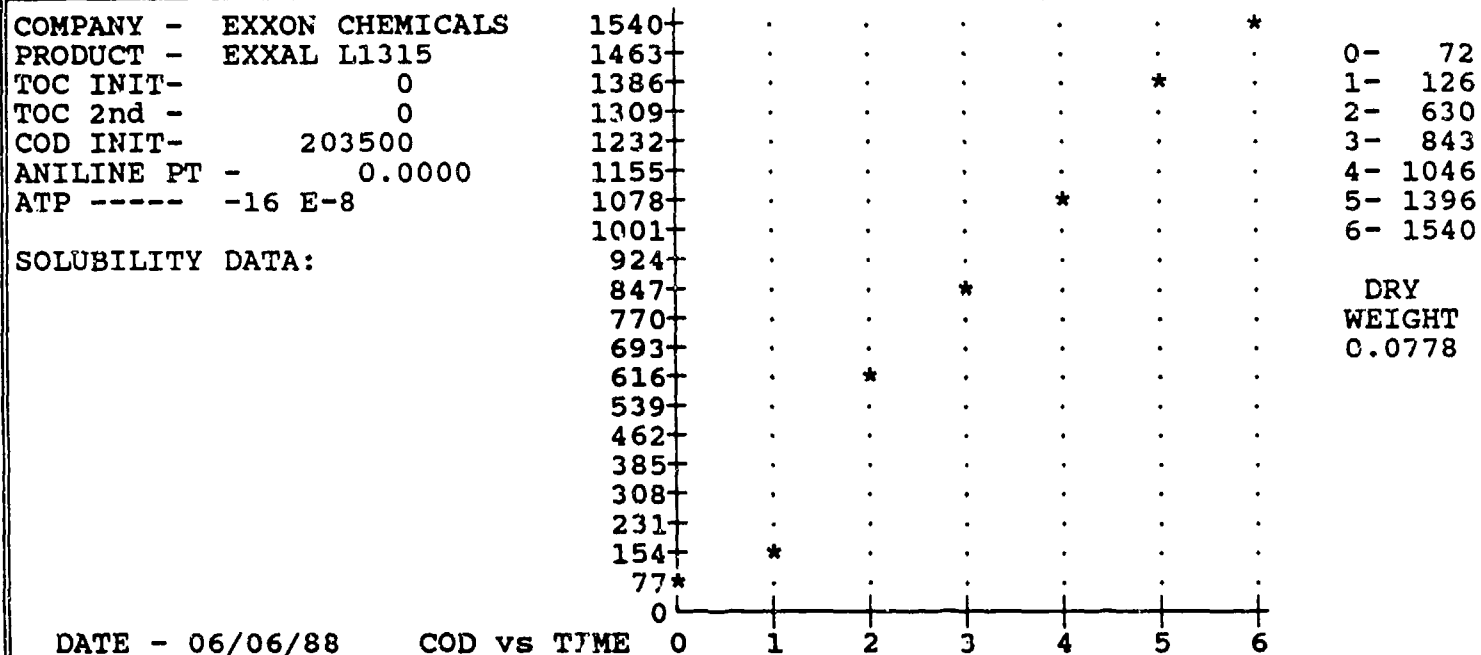
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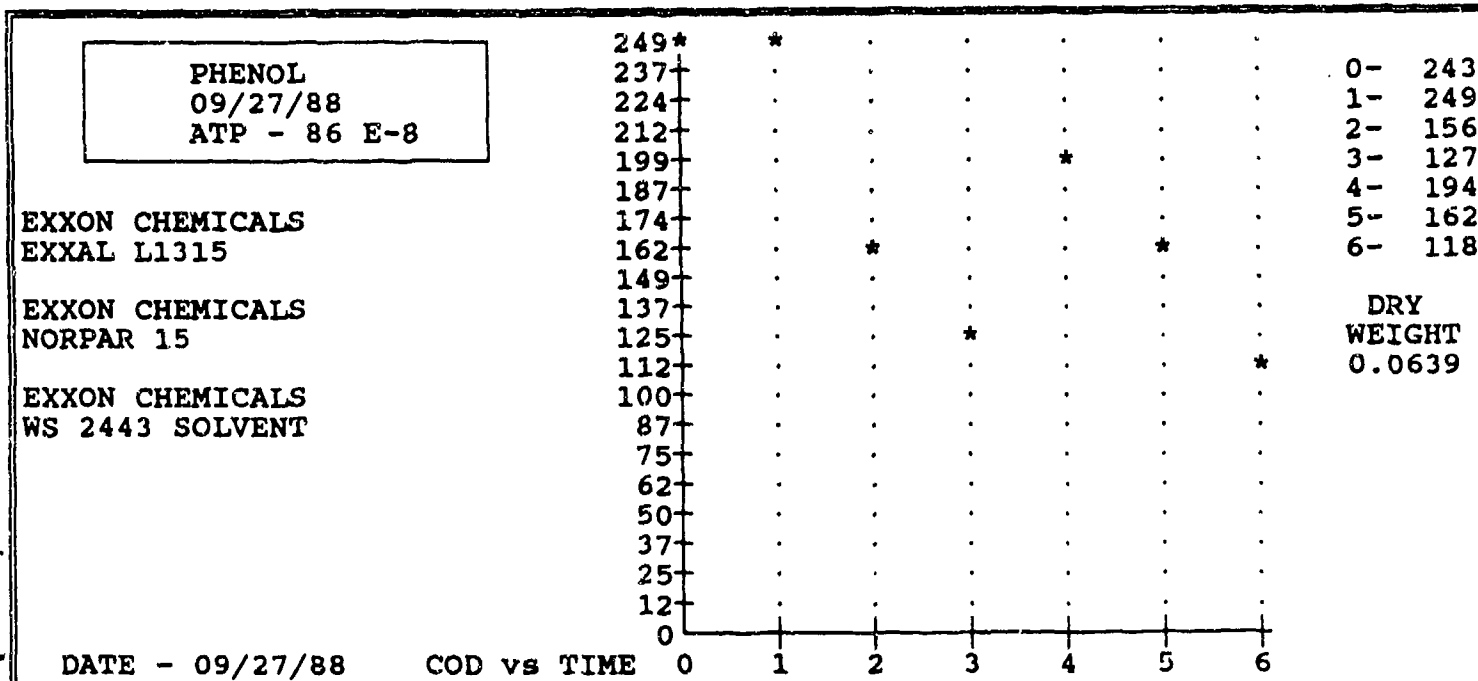
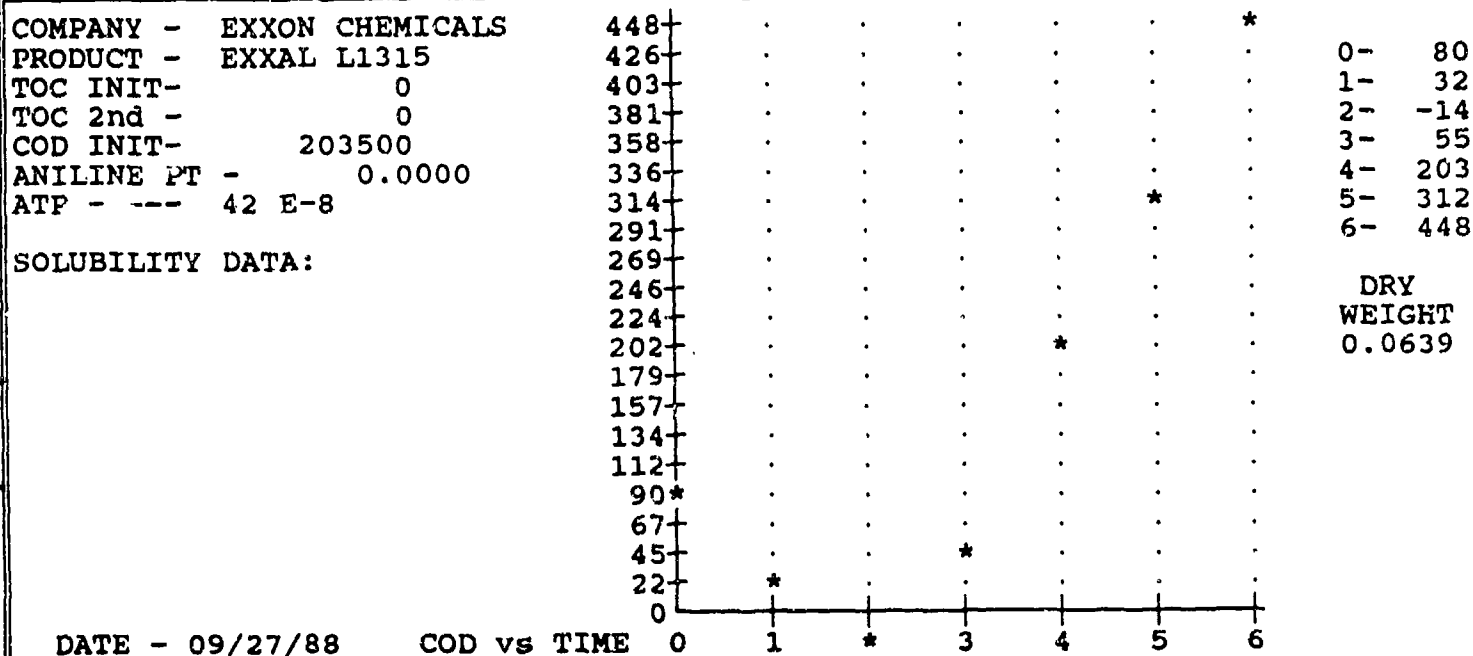
COD vs TIME

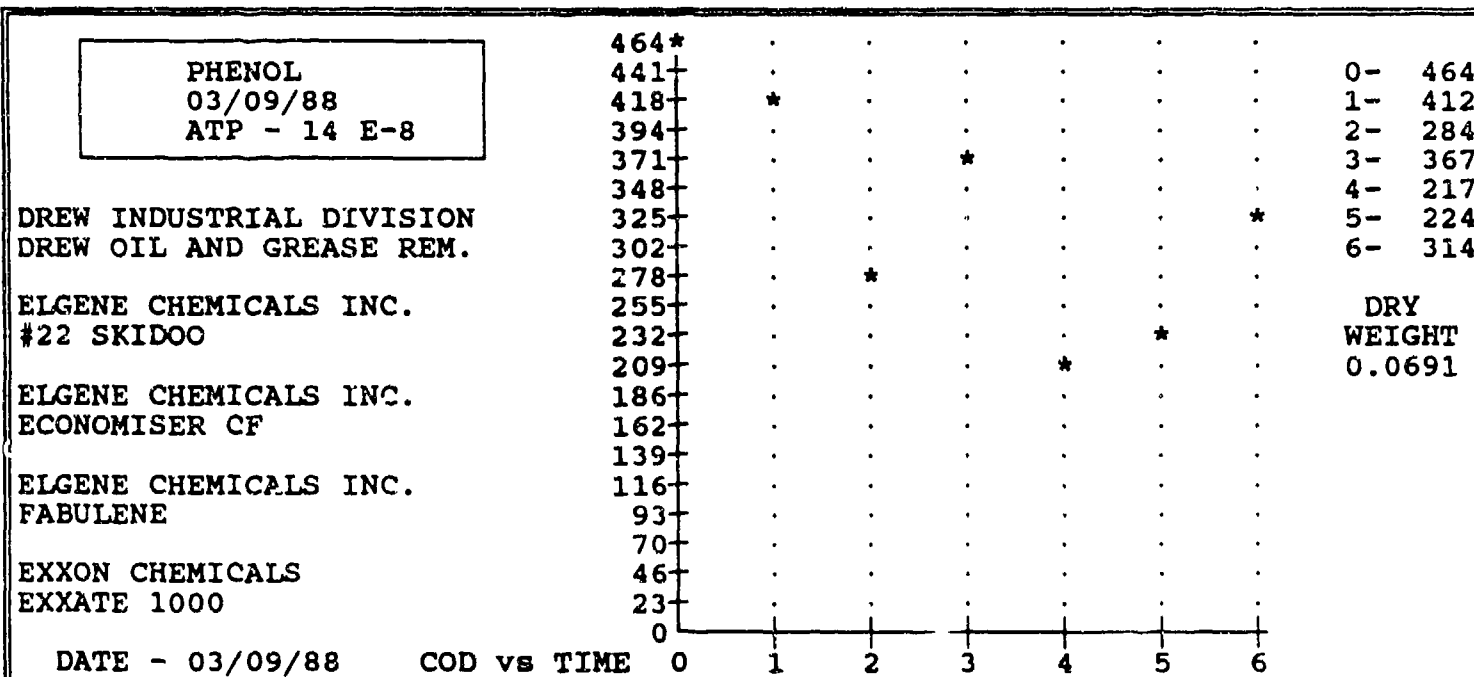
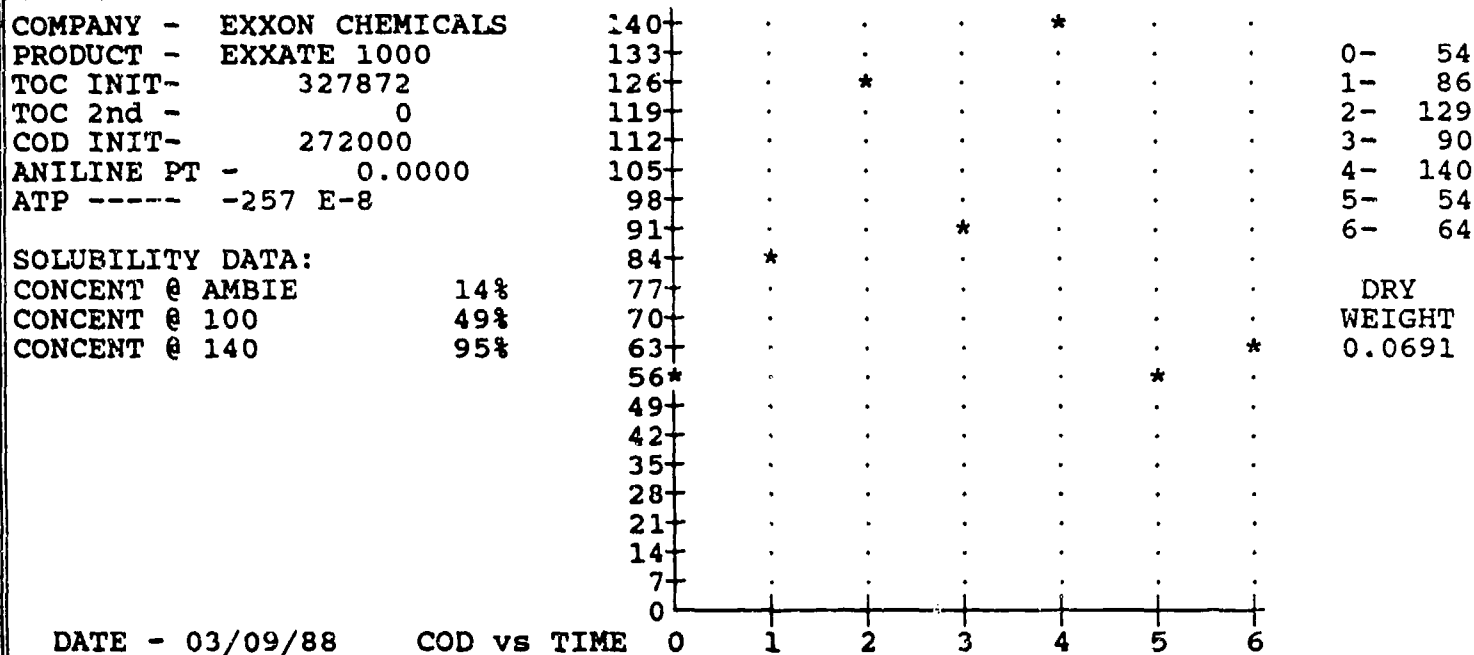


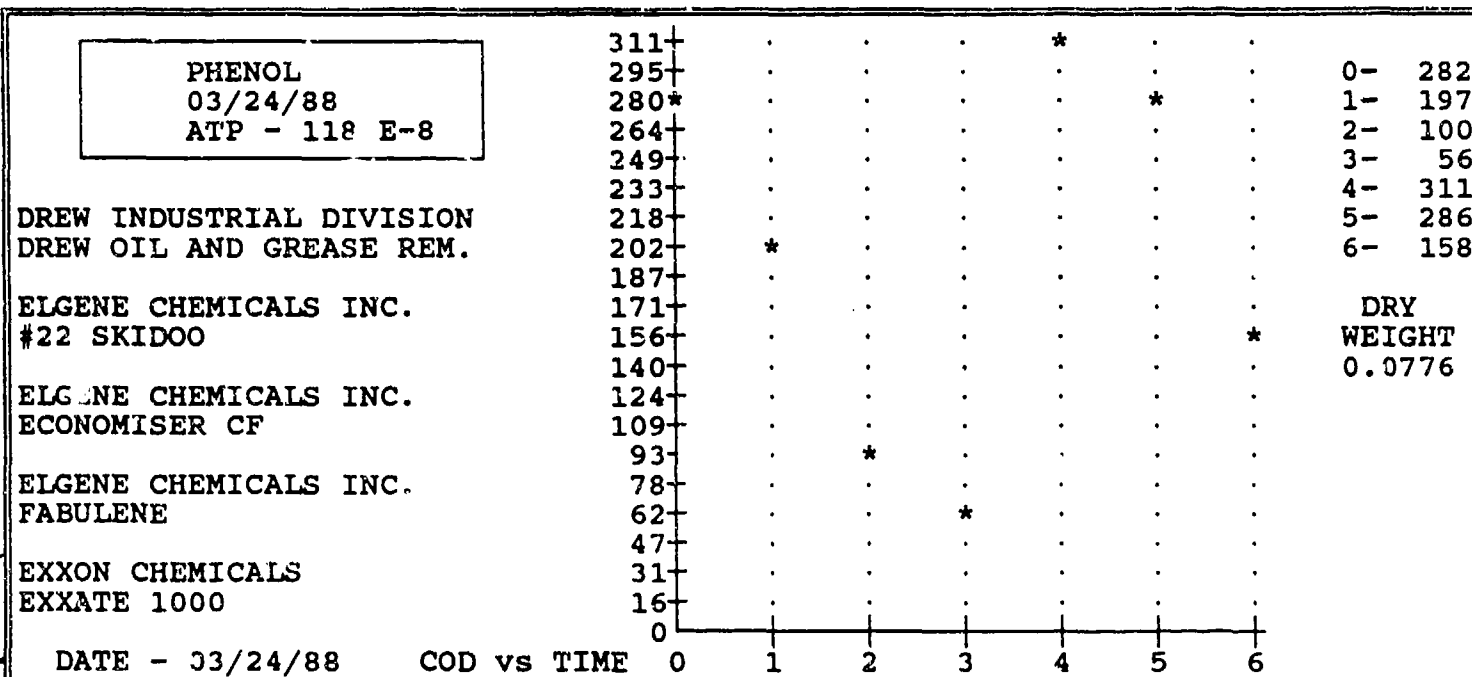
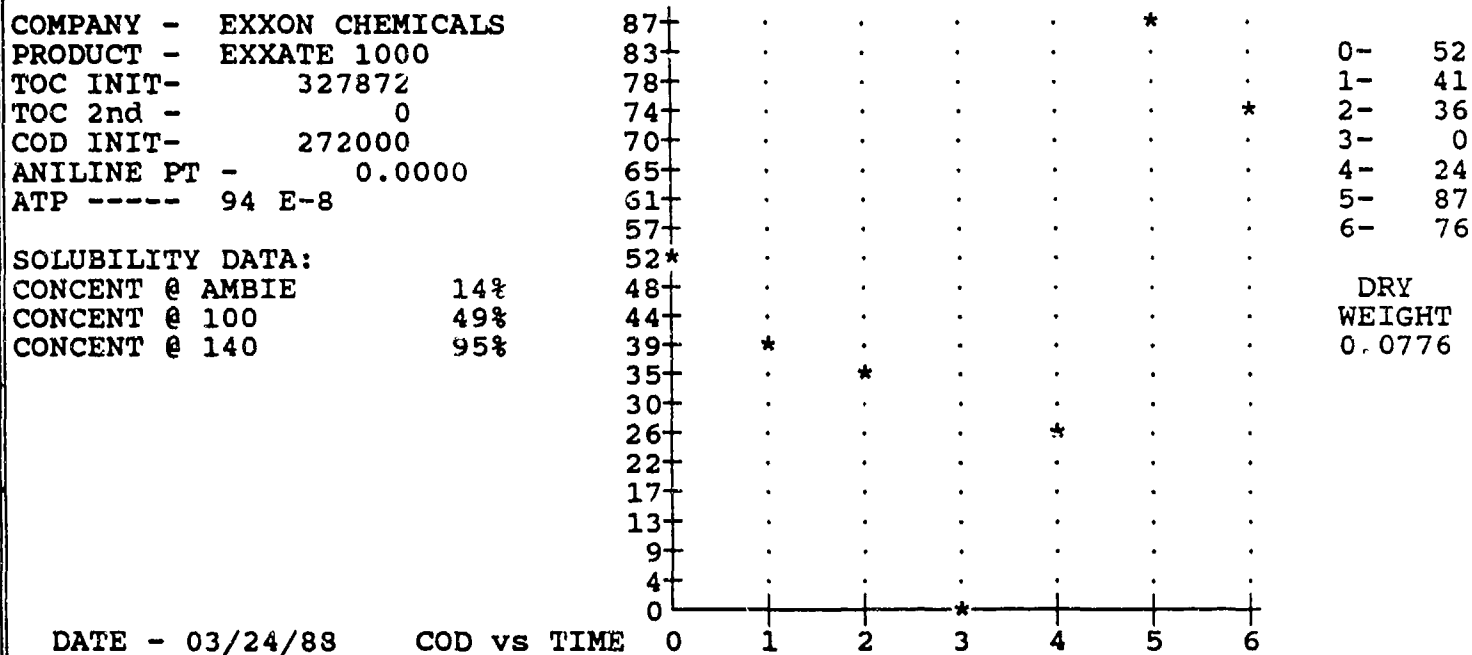
0- 200
 1- 41
 2- -25
 3- -25
 4- 27
 5- 14
 6- 38

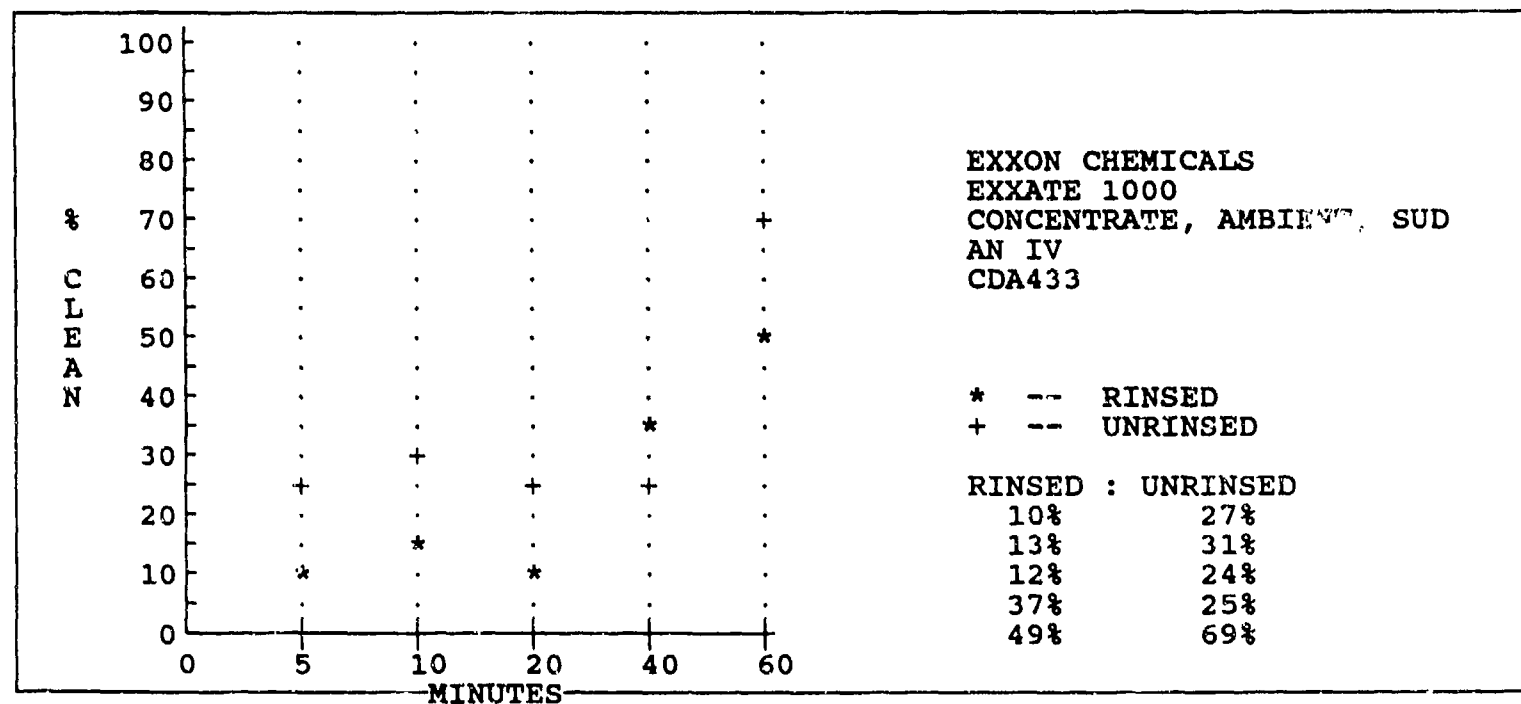
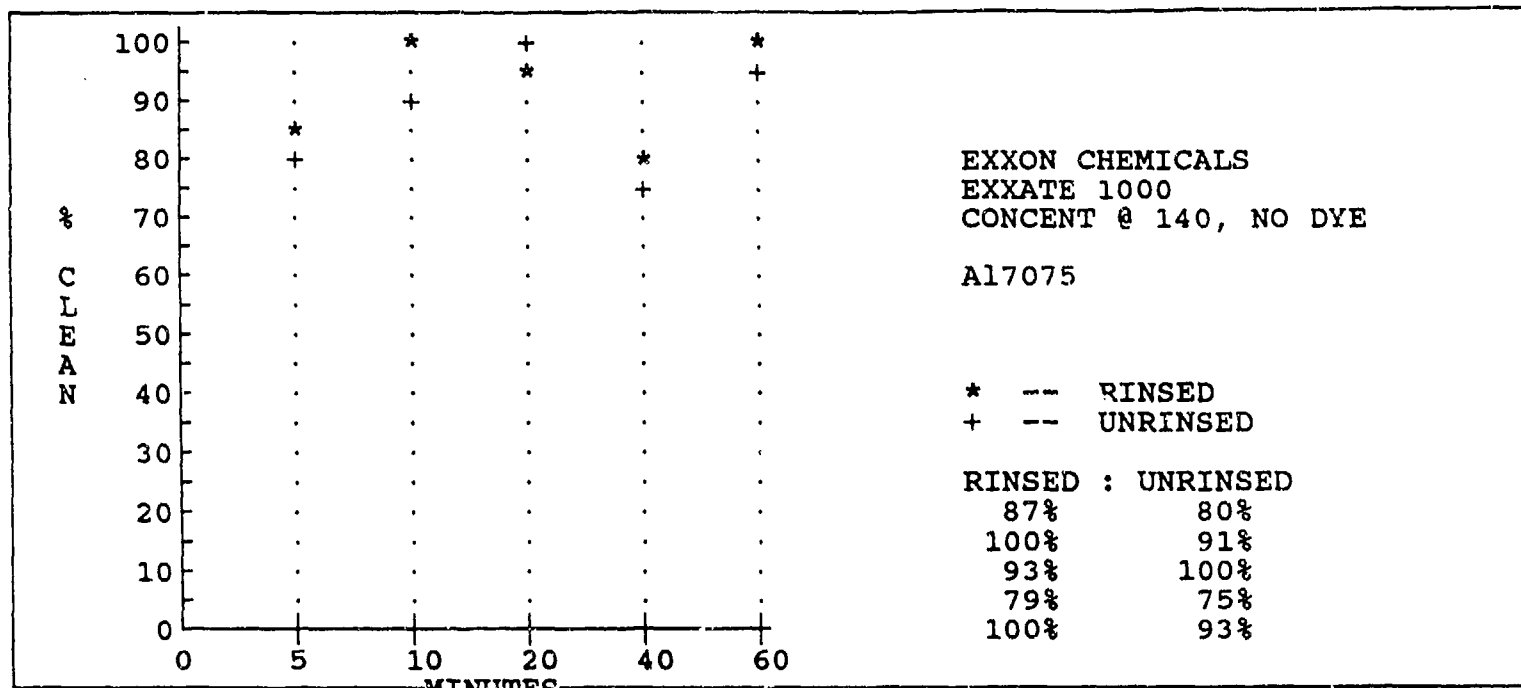
DRY
 WEIGHT
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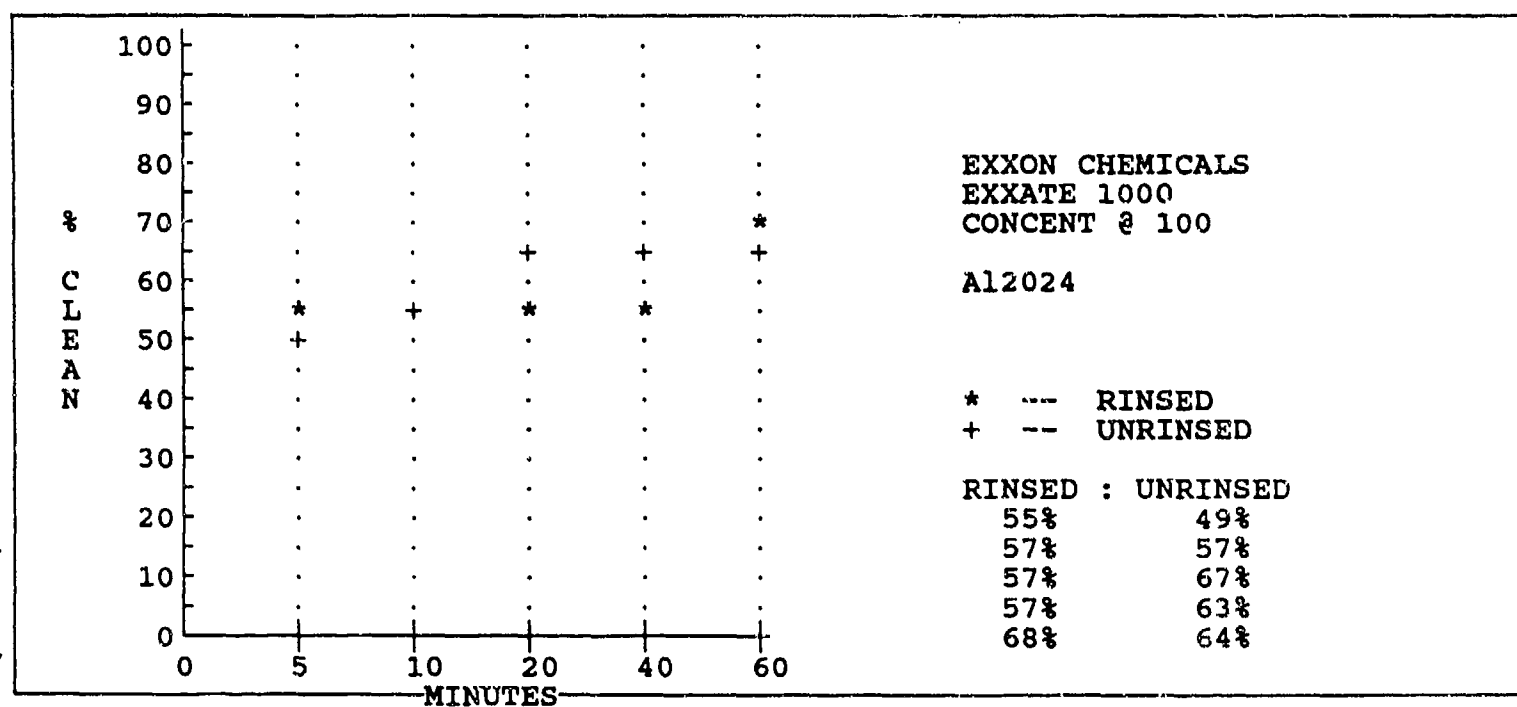
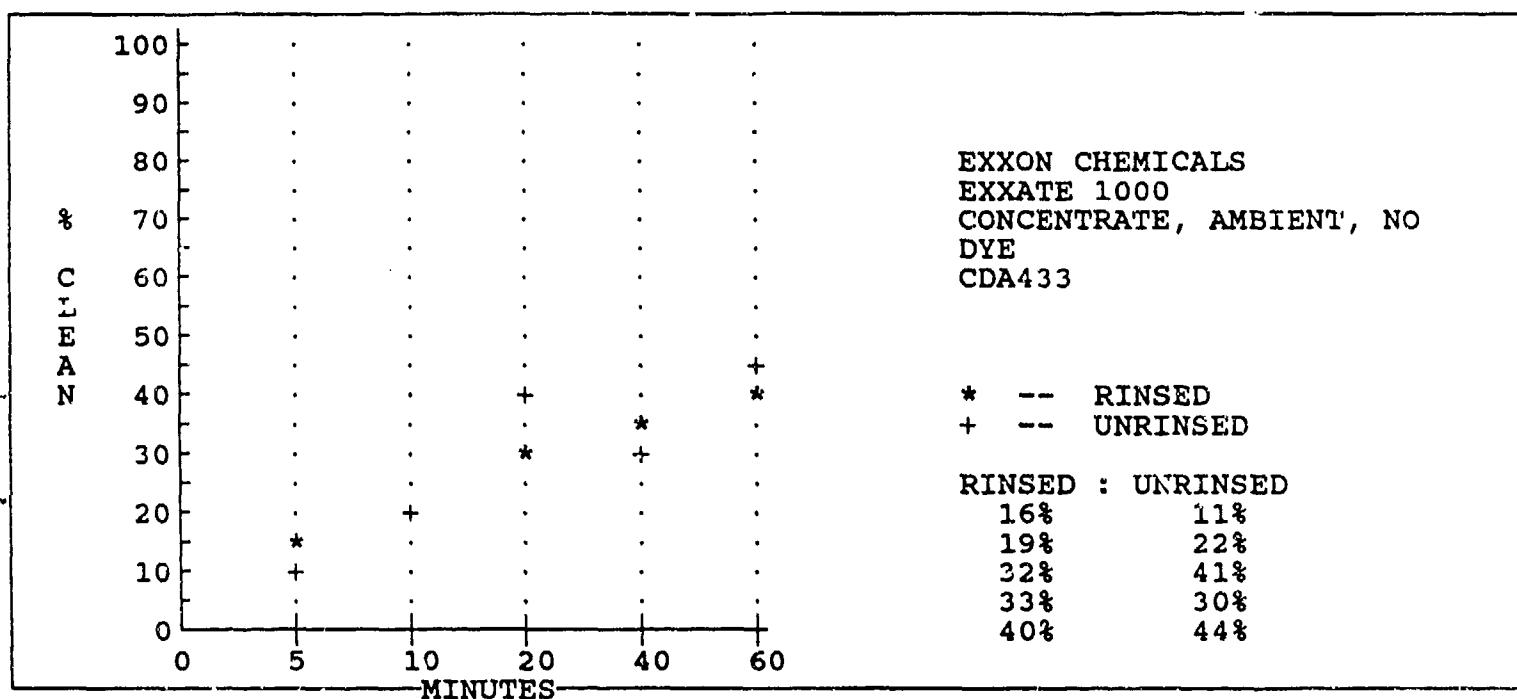


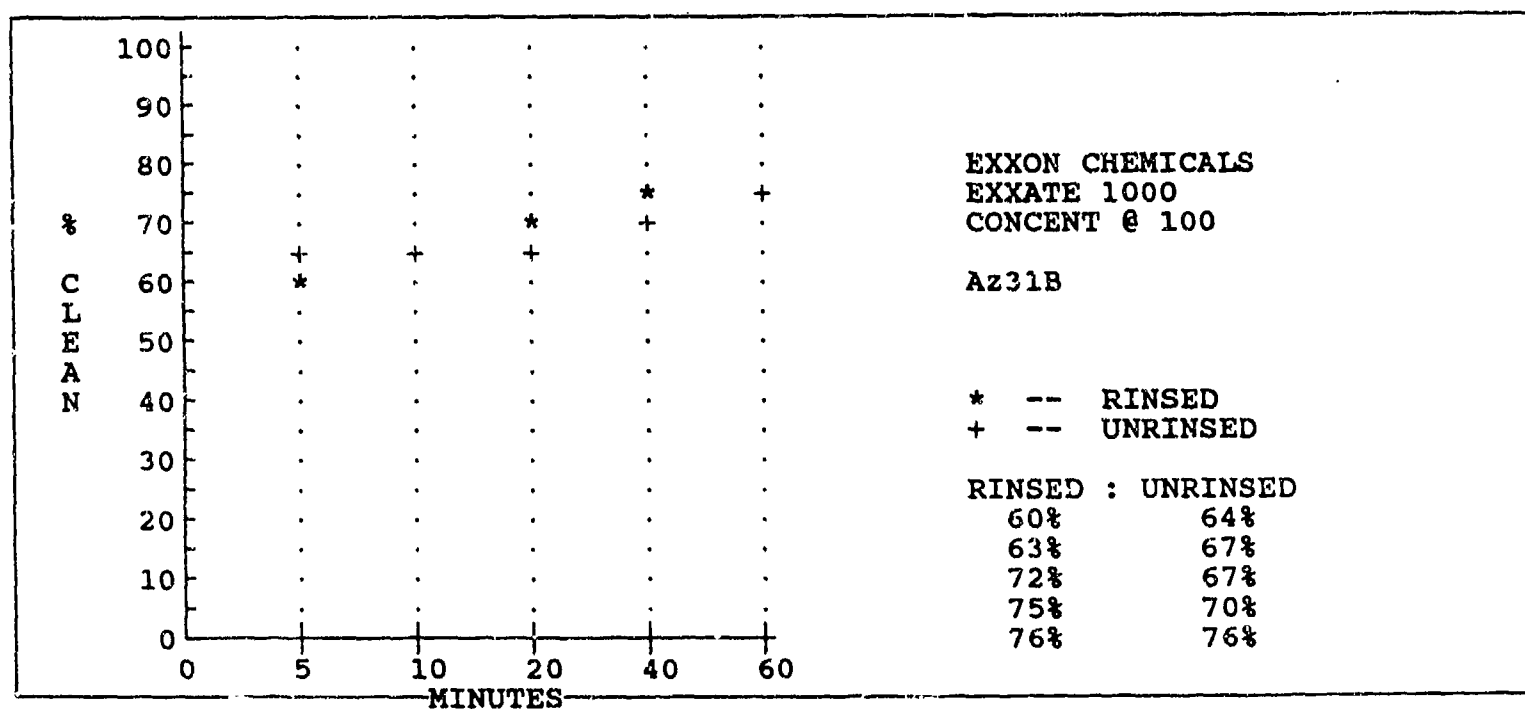
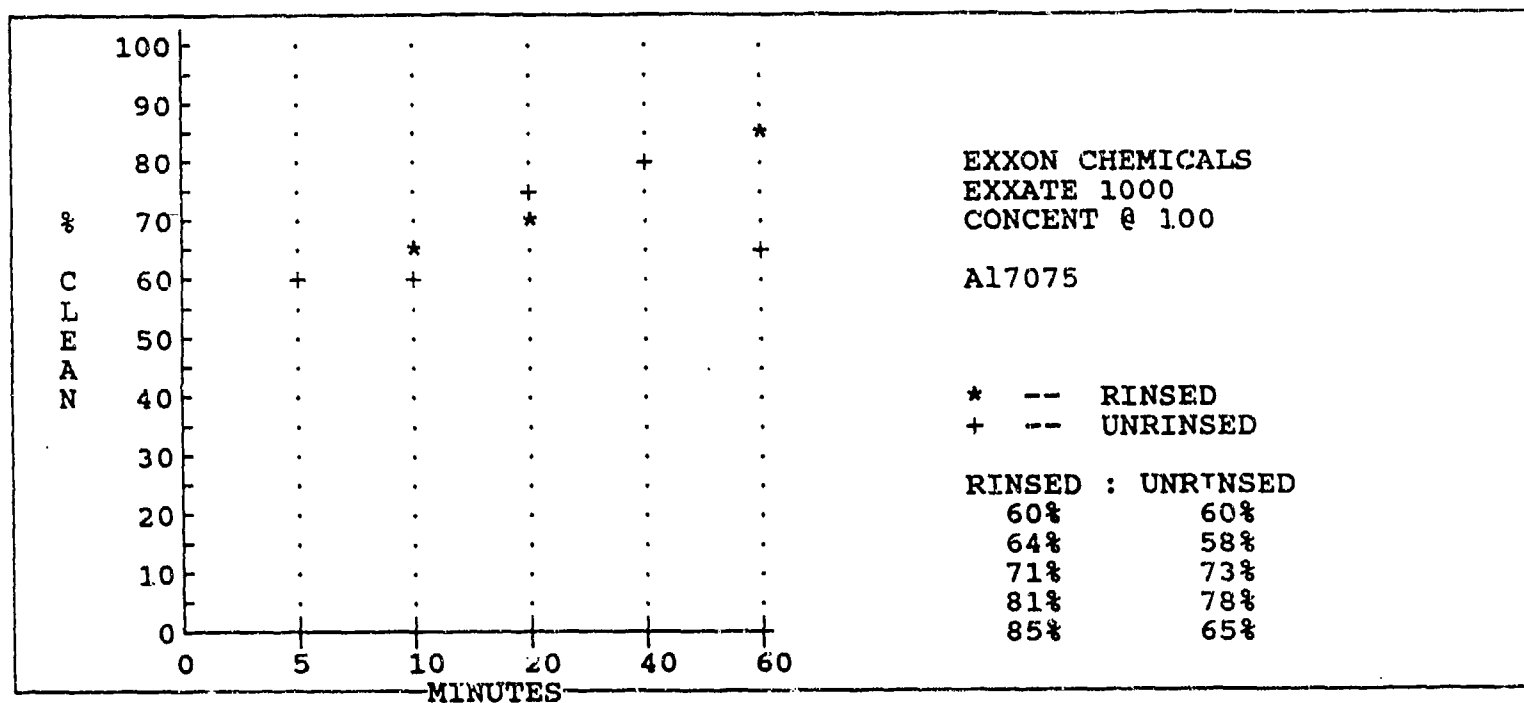


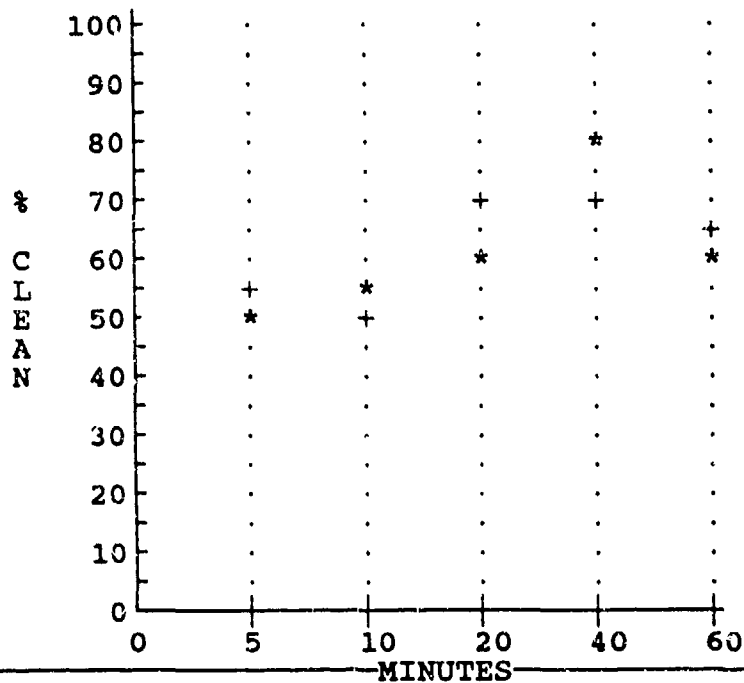












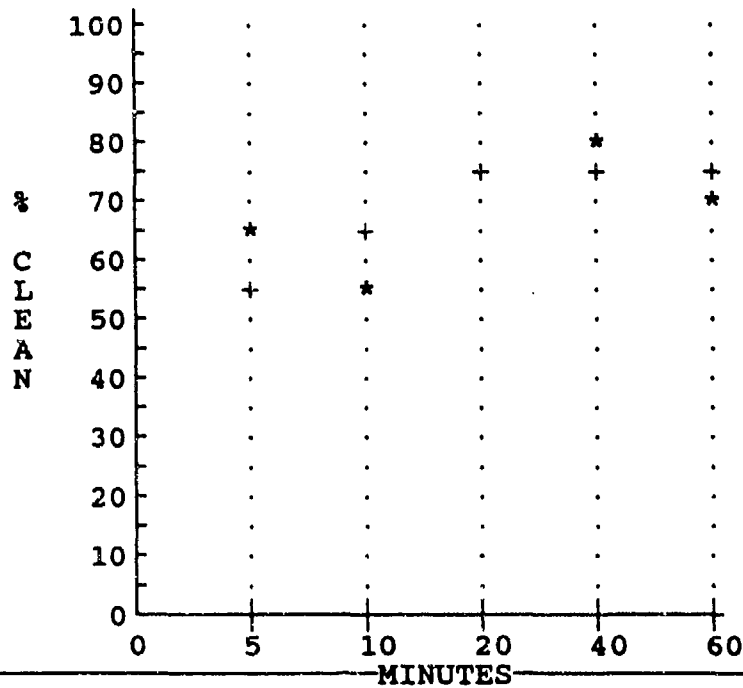
EXXON CHEMICALS
EXXATE 1000
CONCENT @ 100

C1020

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED

52%	53%
57%	52%
62%	68%
82%	68%
61%	64%



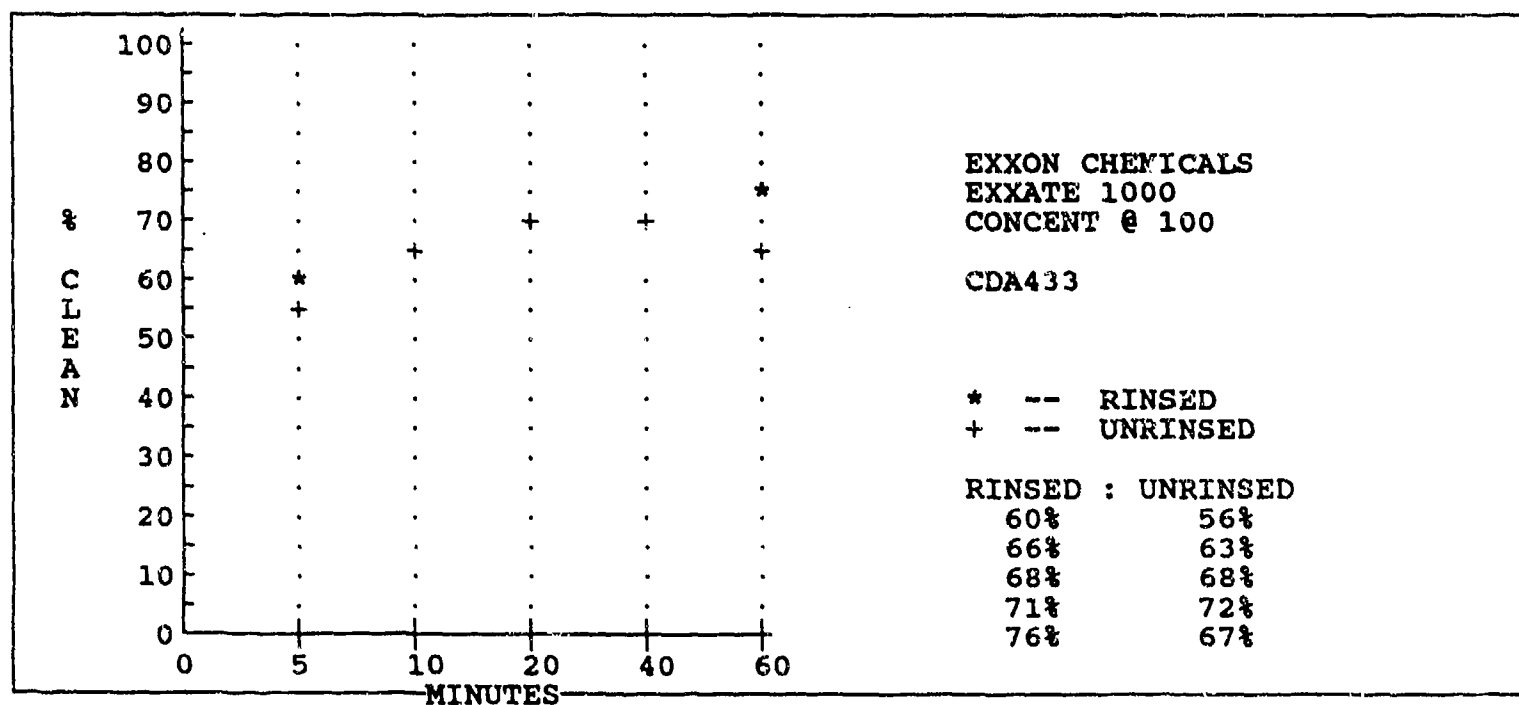
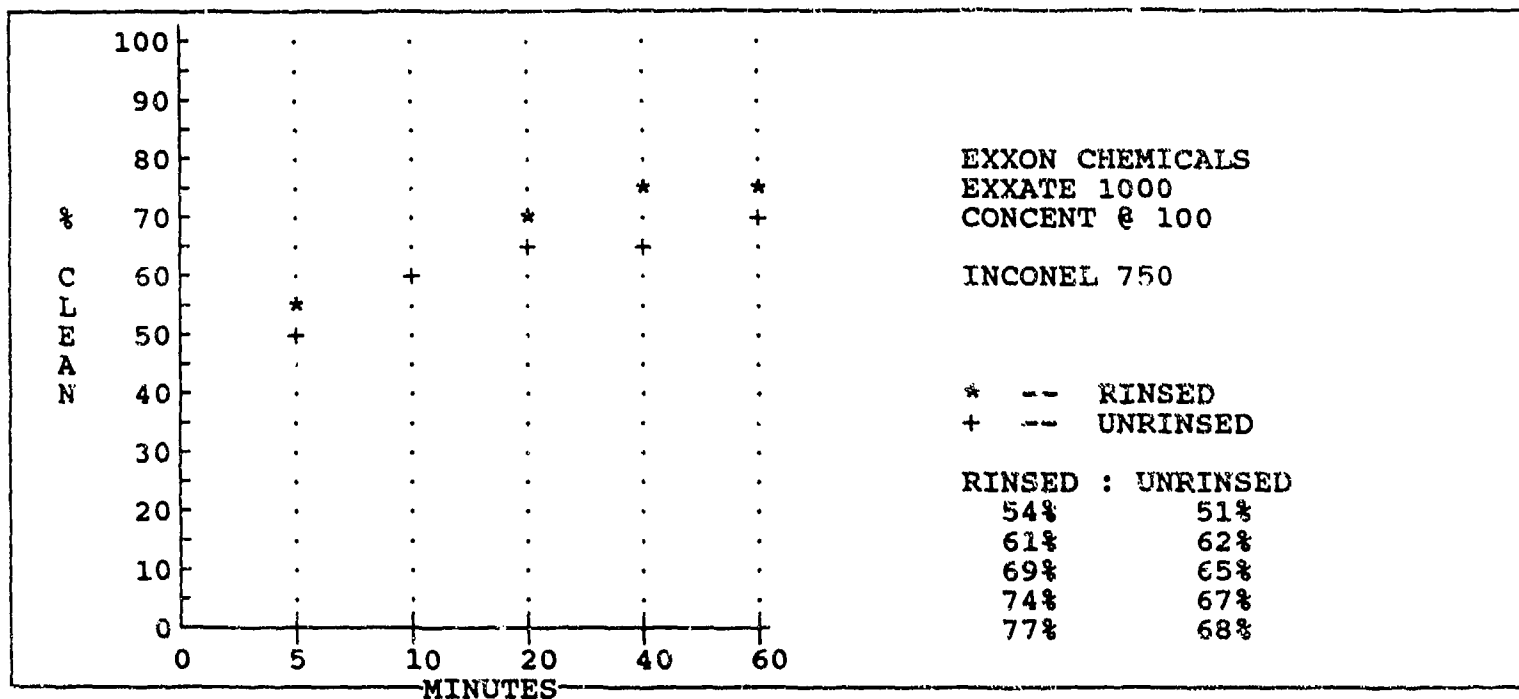
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EXXATE 1000
CONCENT @ 100

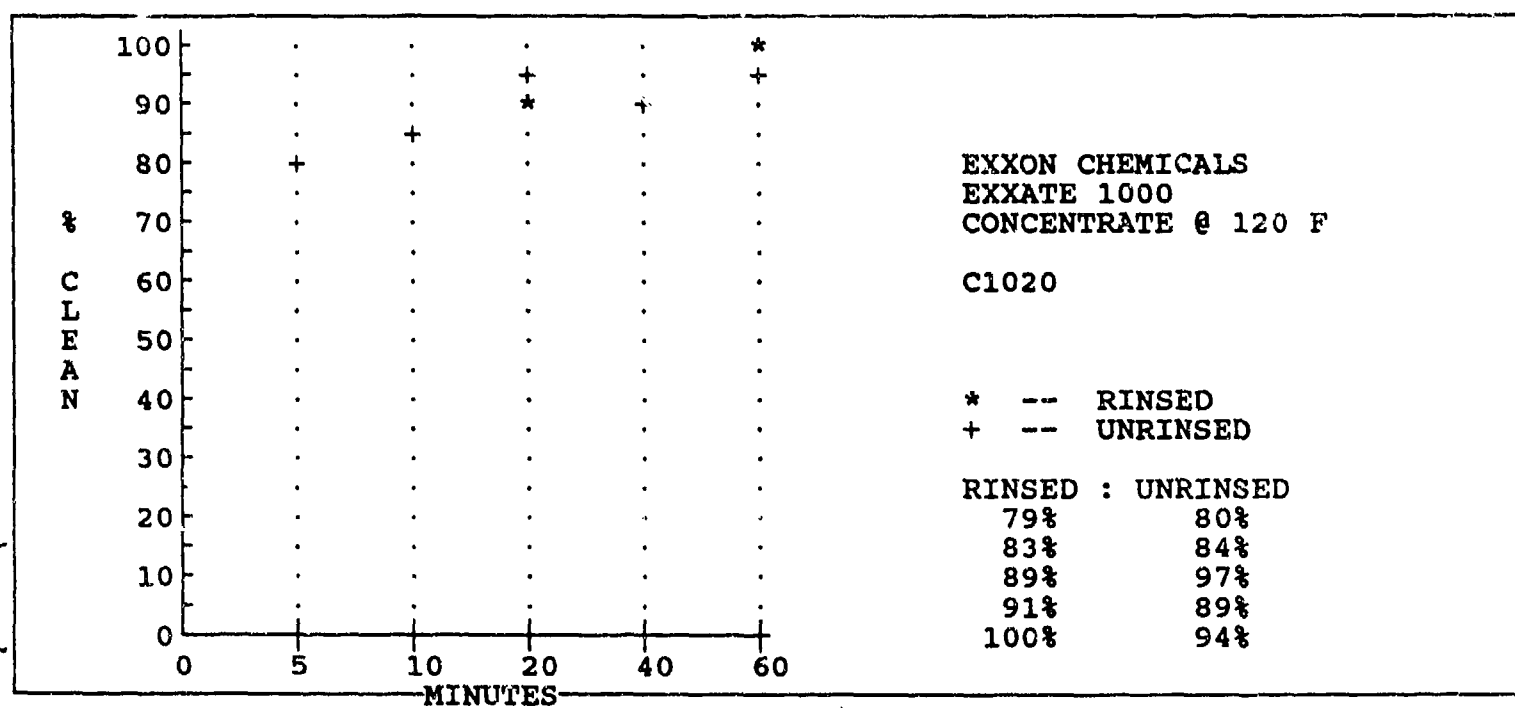
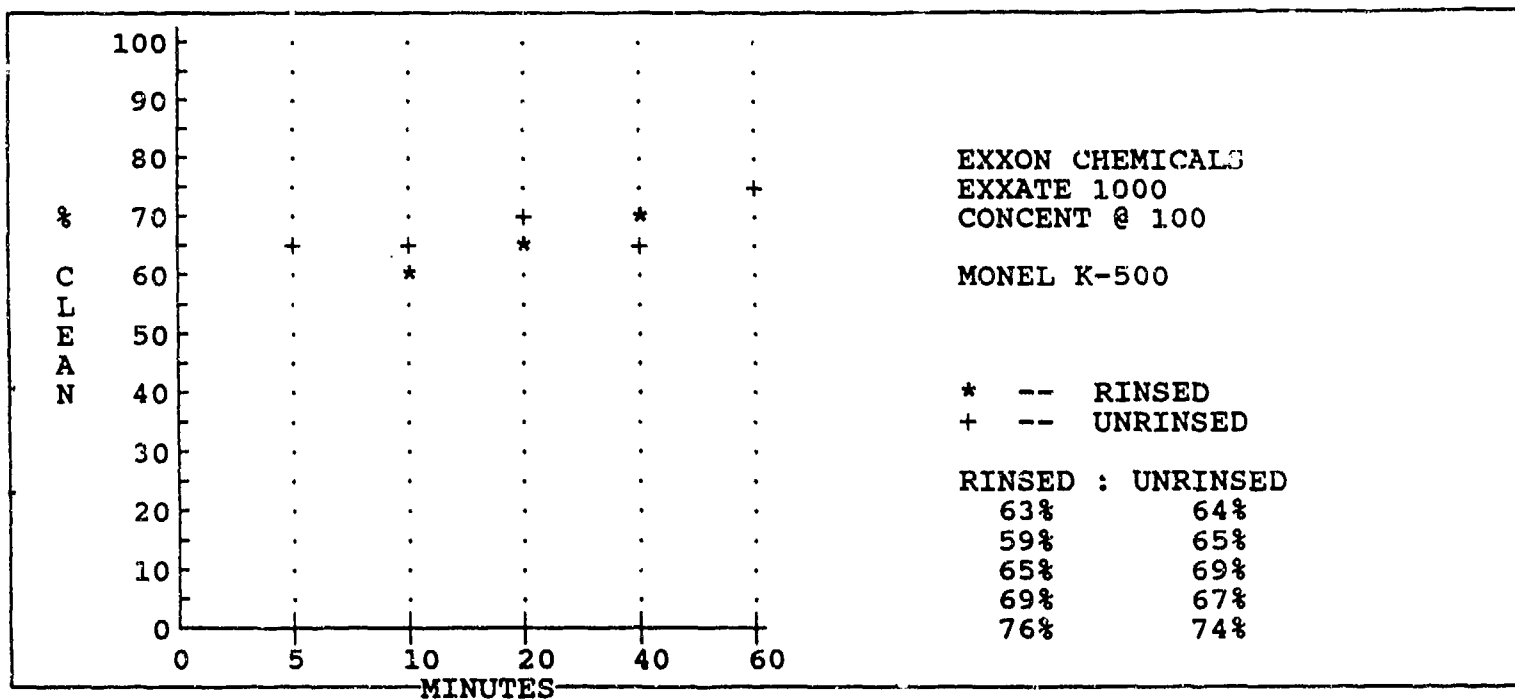
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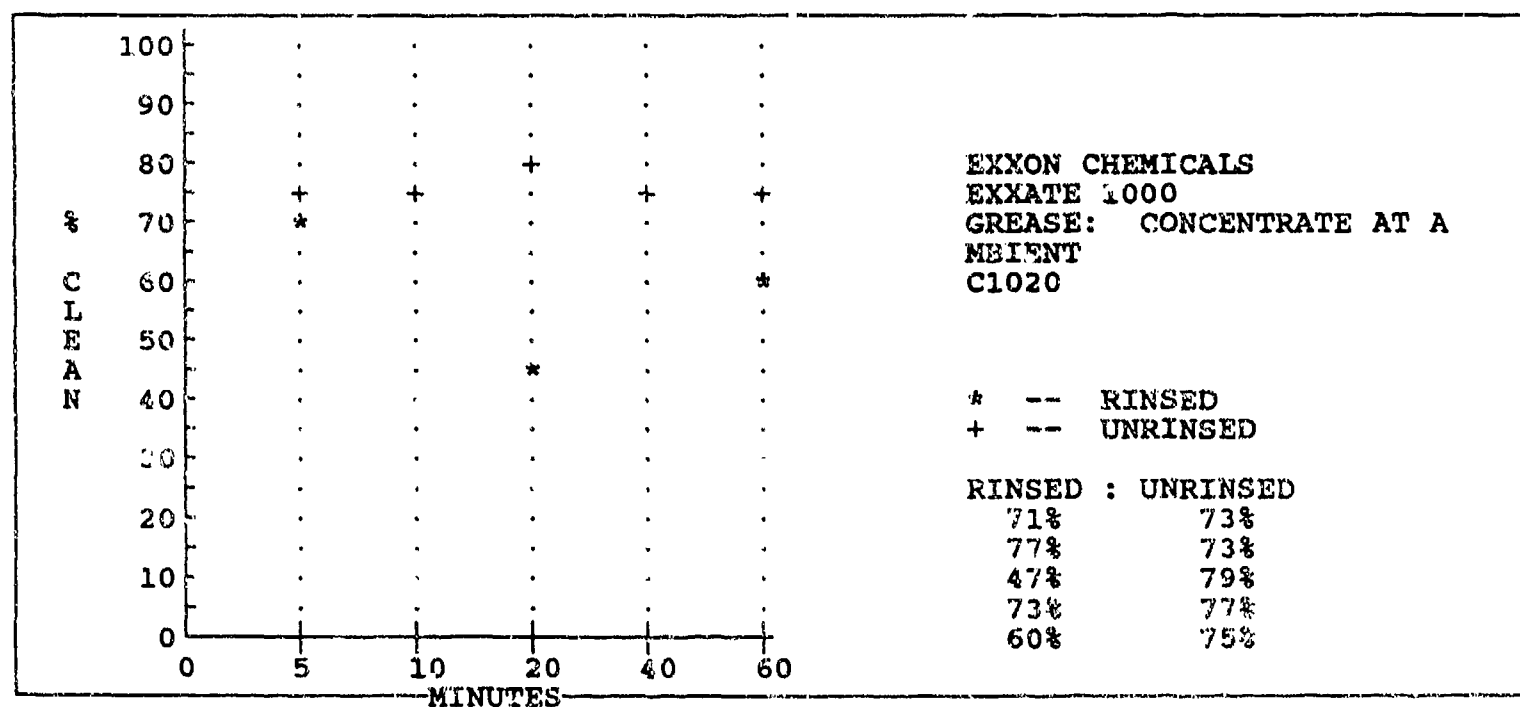
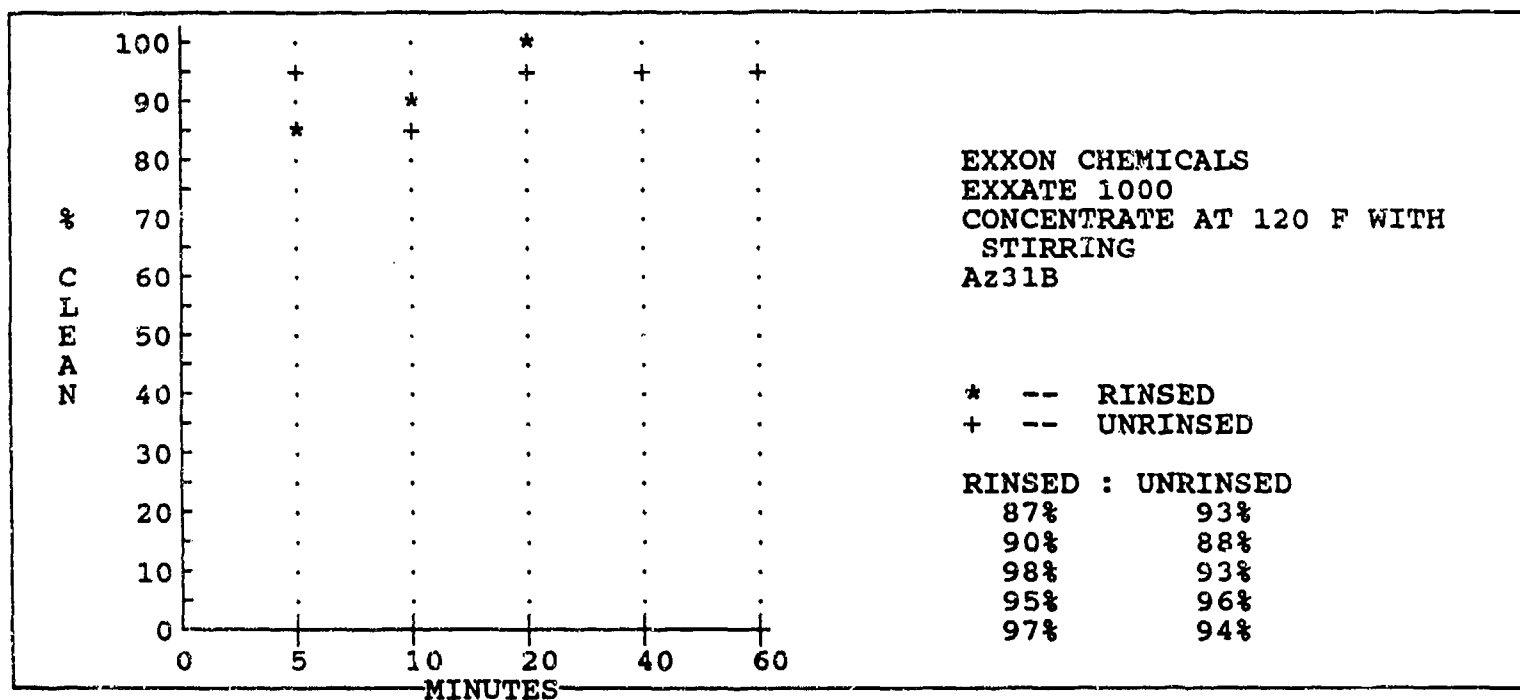
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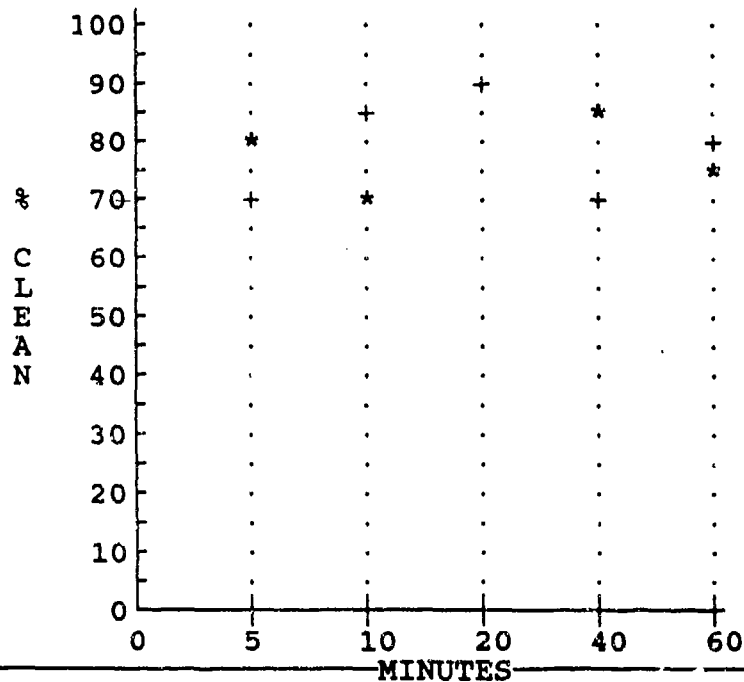
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68%	73%





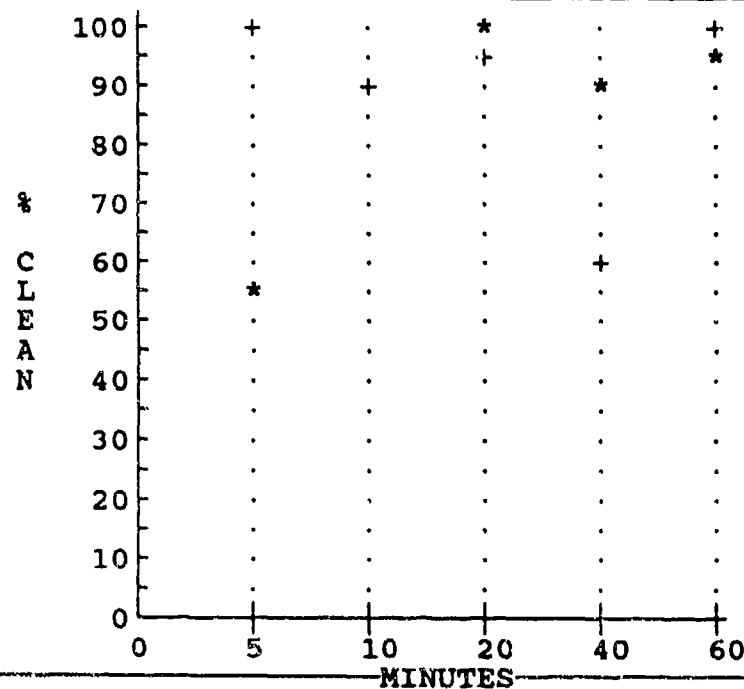




EXXON CHEMICALS
EXXATE 1000
GREASE: CONCENTRATE AT 120 F
MONEL K-500

* -- RINSED
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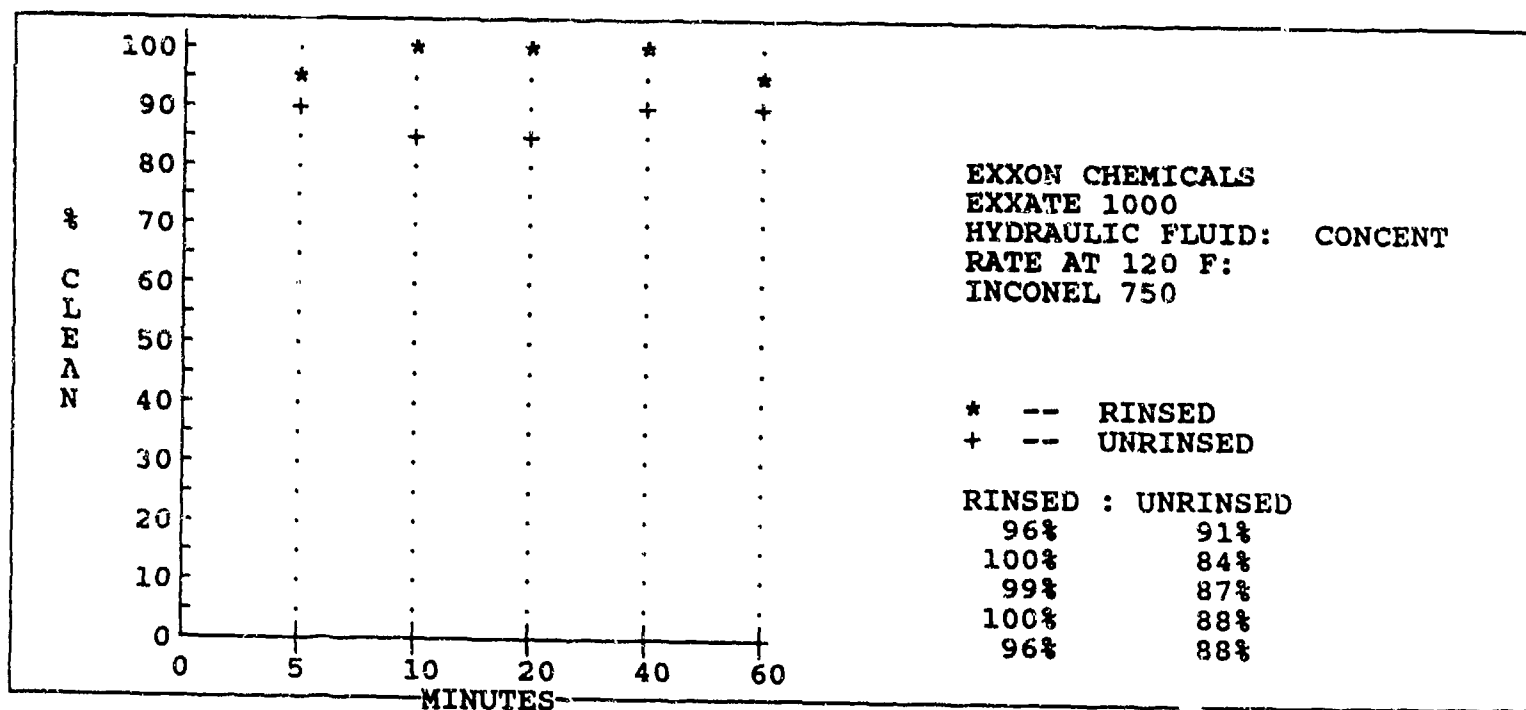
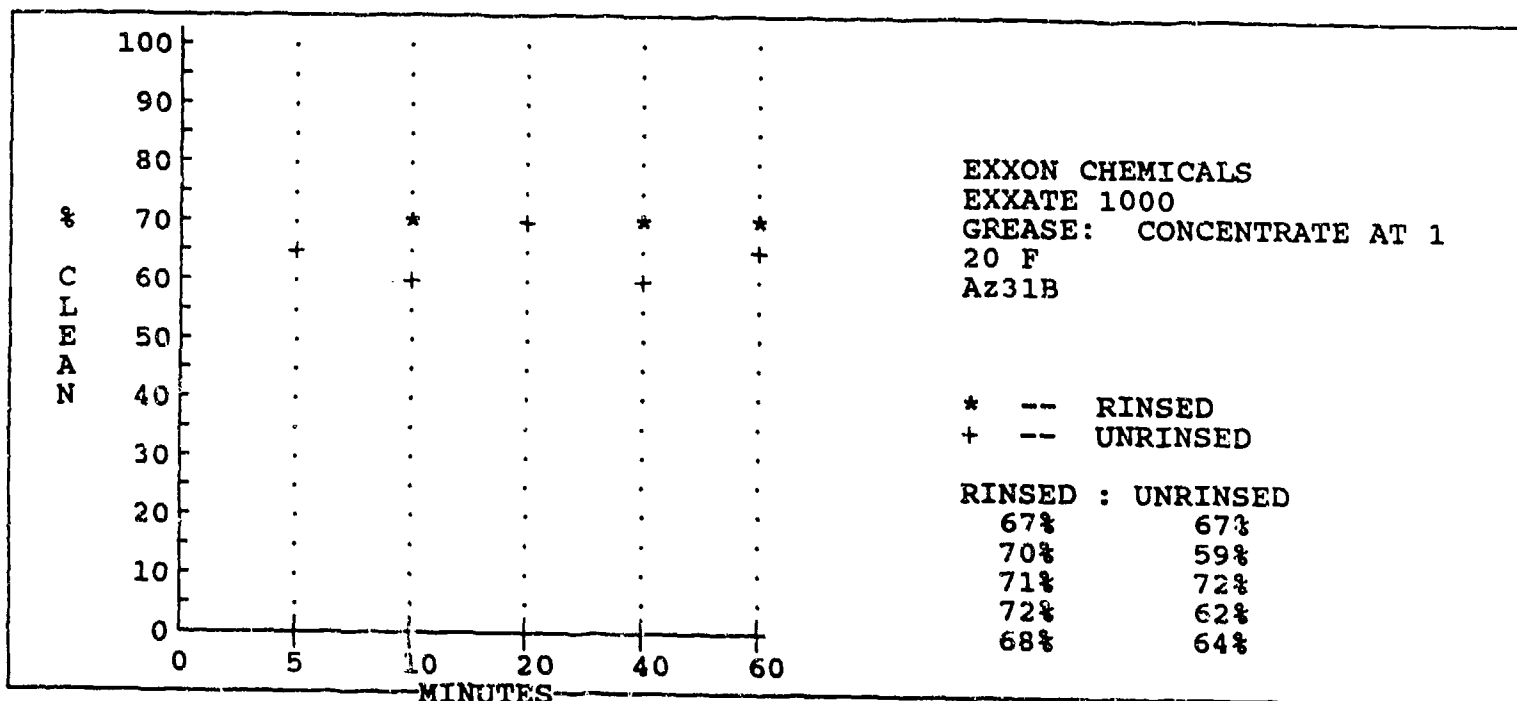
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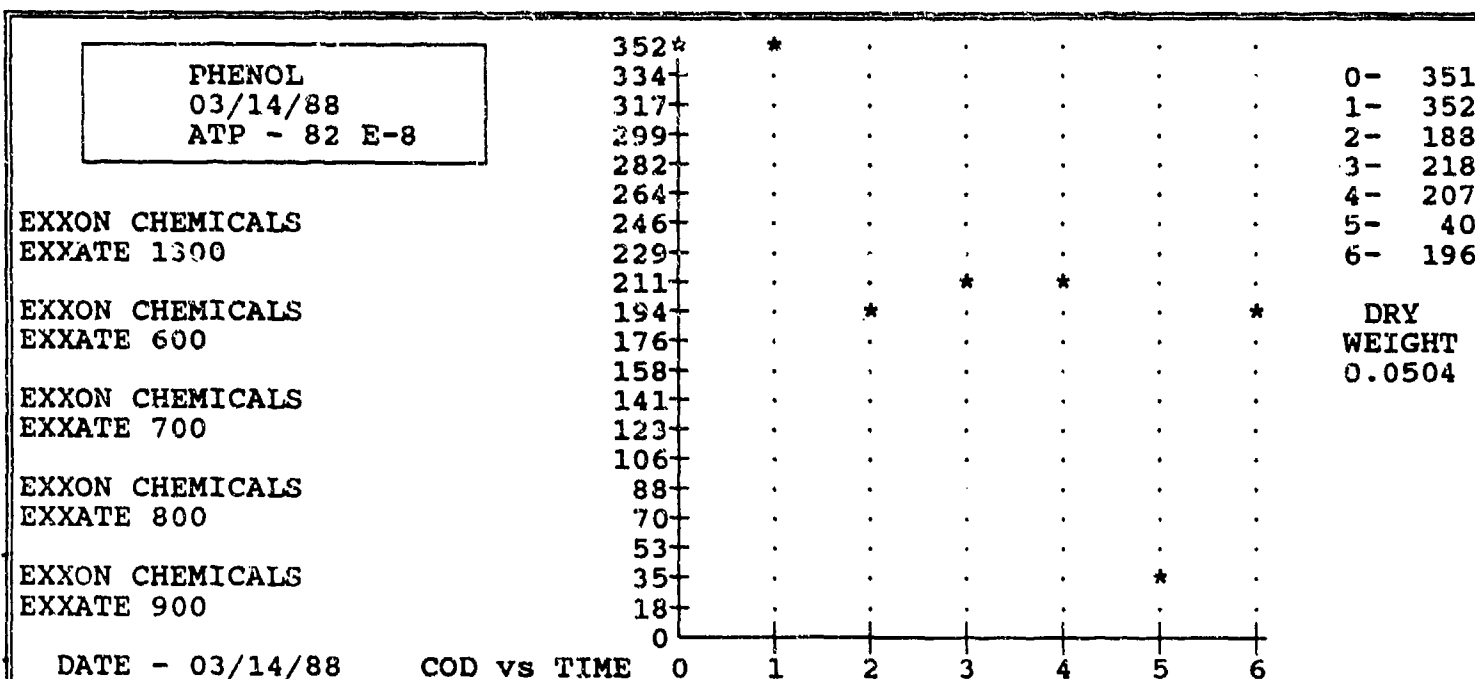
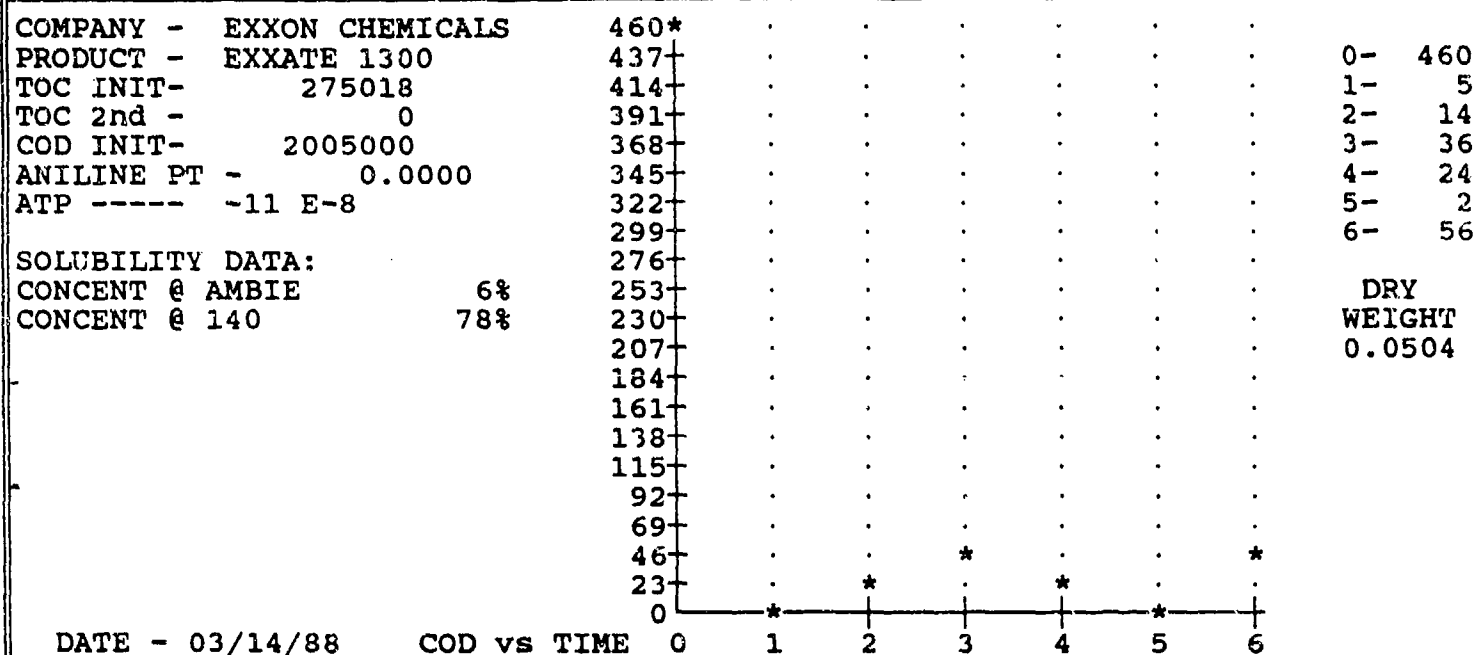


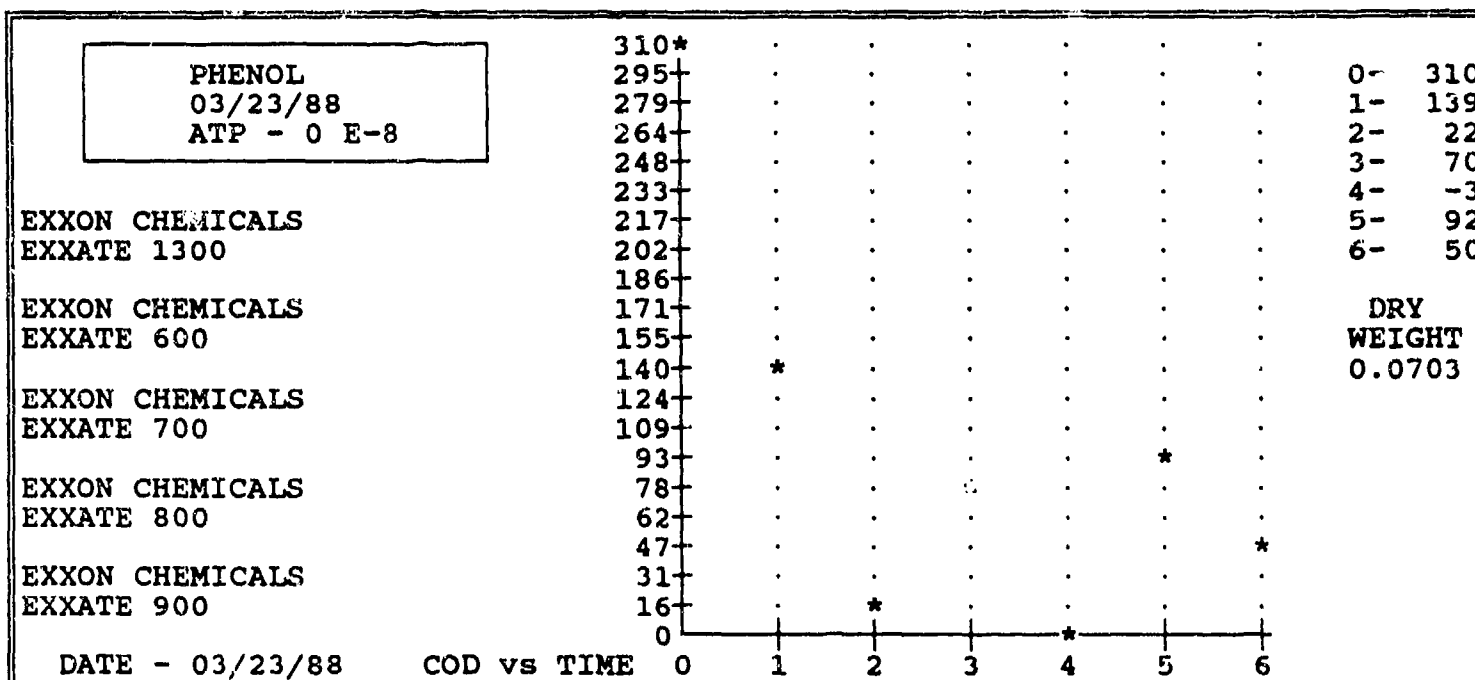
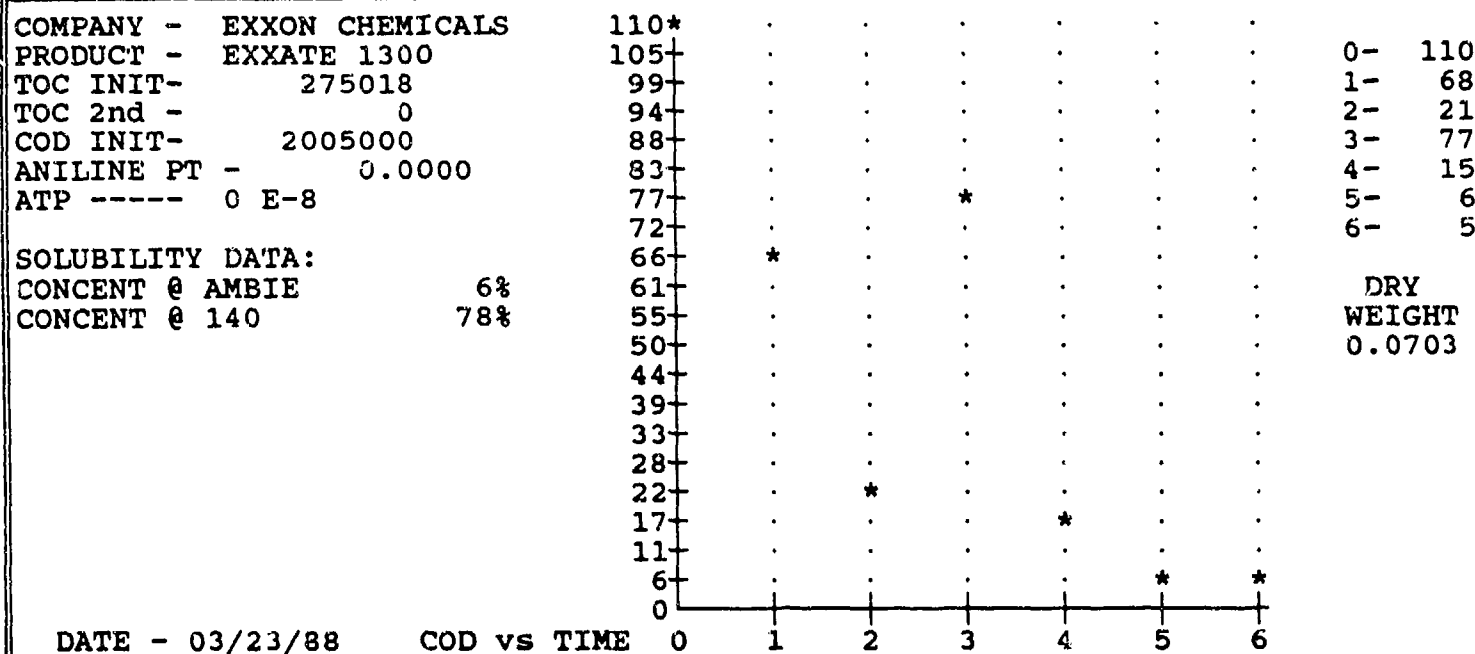
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OIL/XYLENE: CONCENTRATE
AT 140 F
AL7075

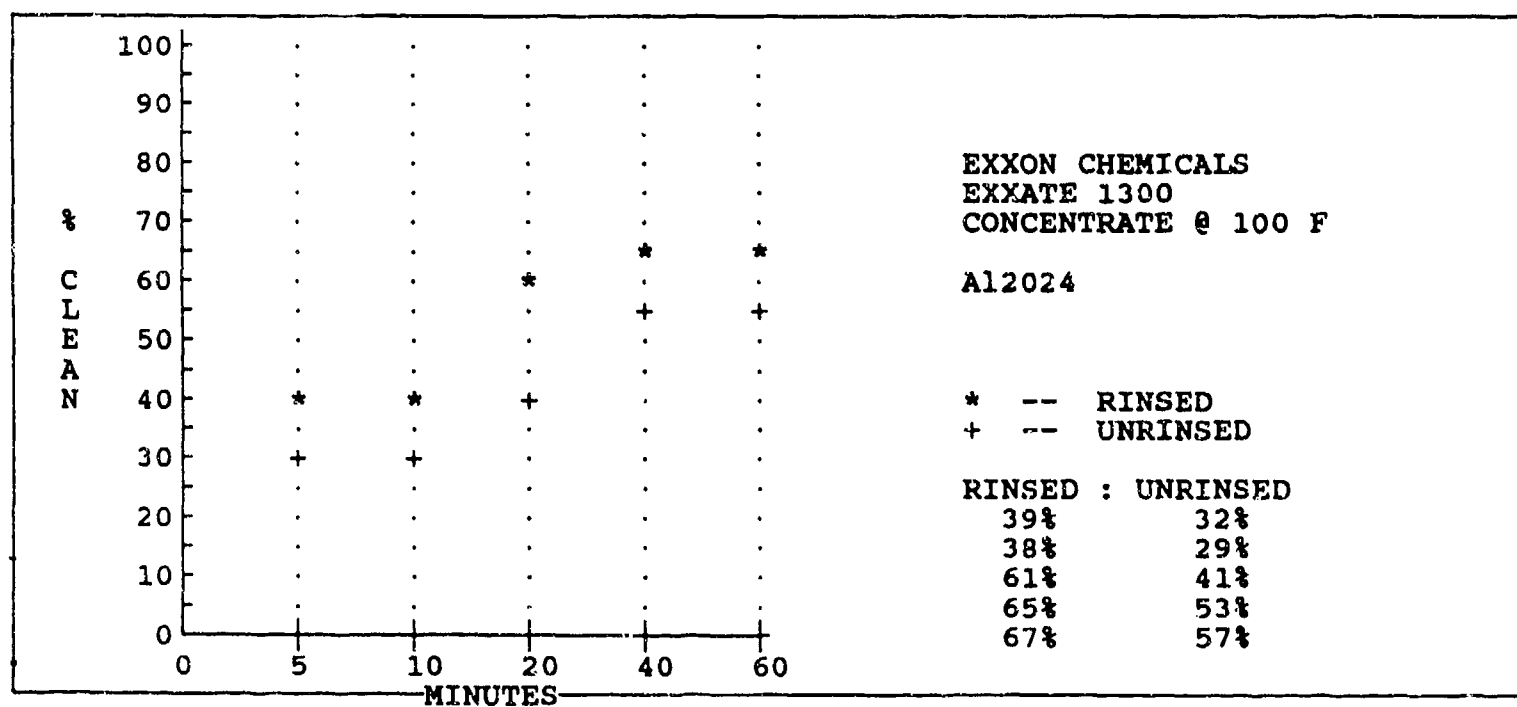
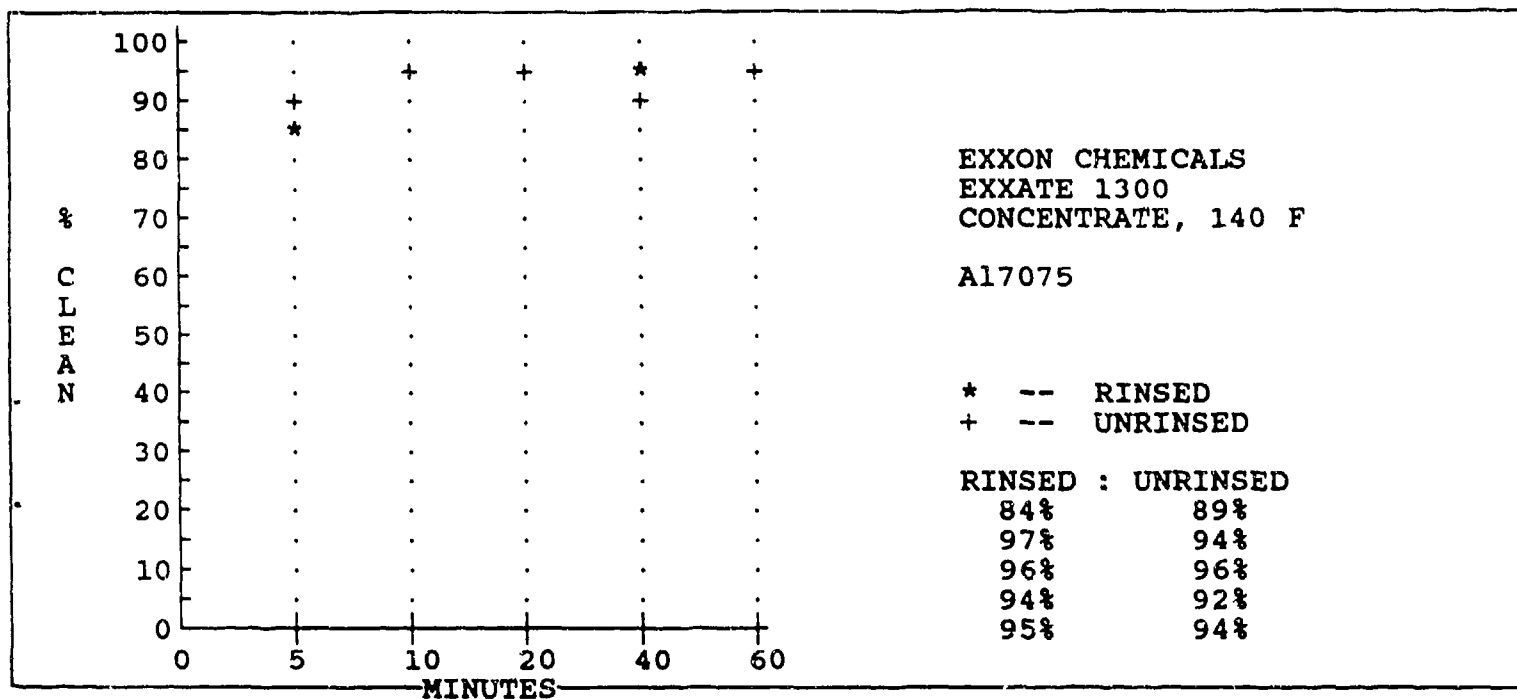
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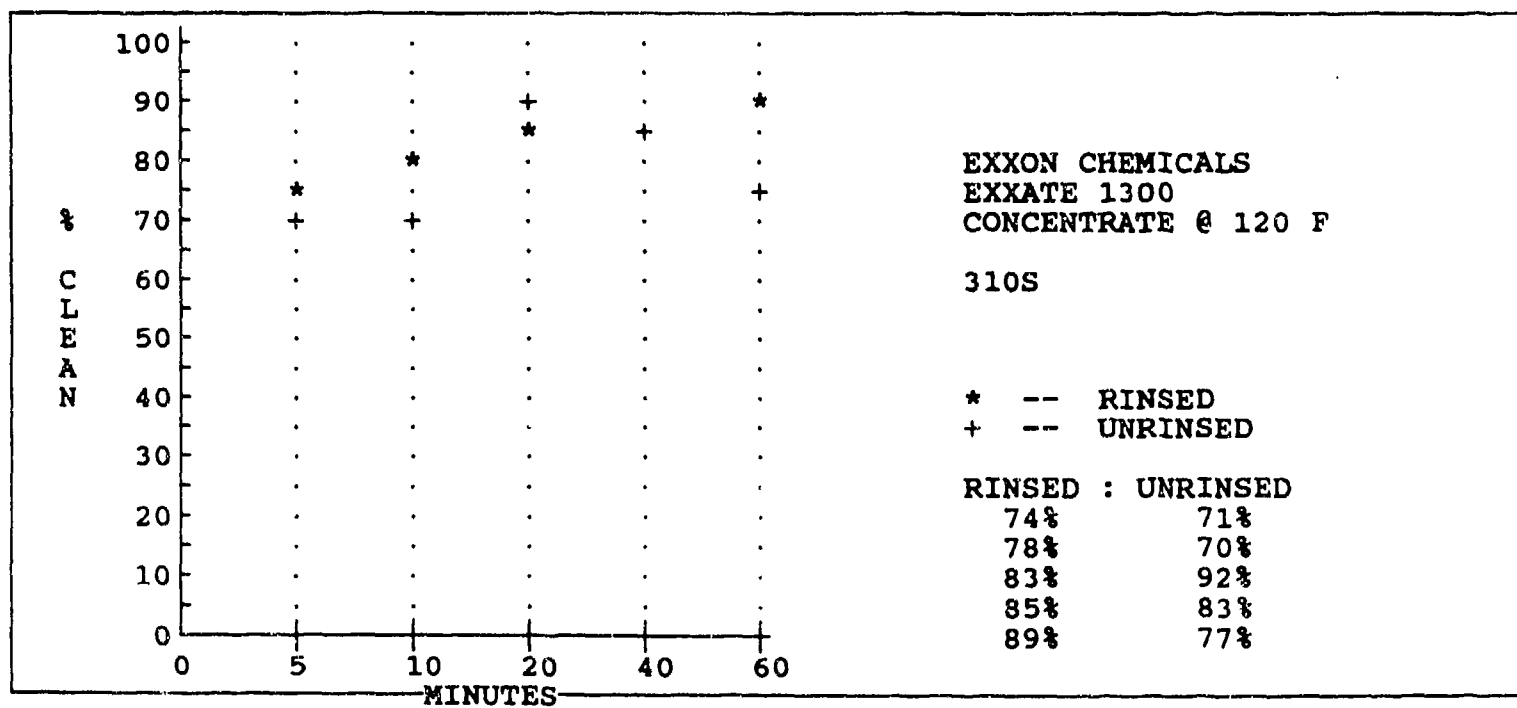
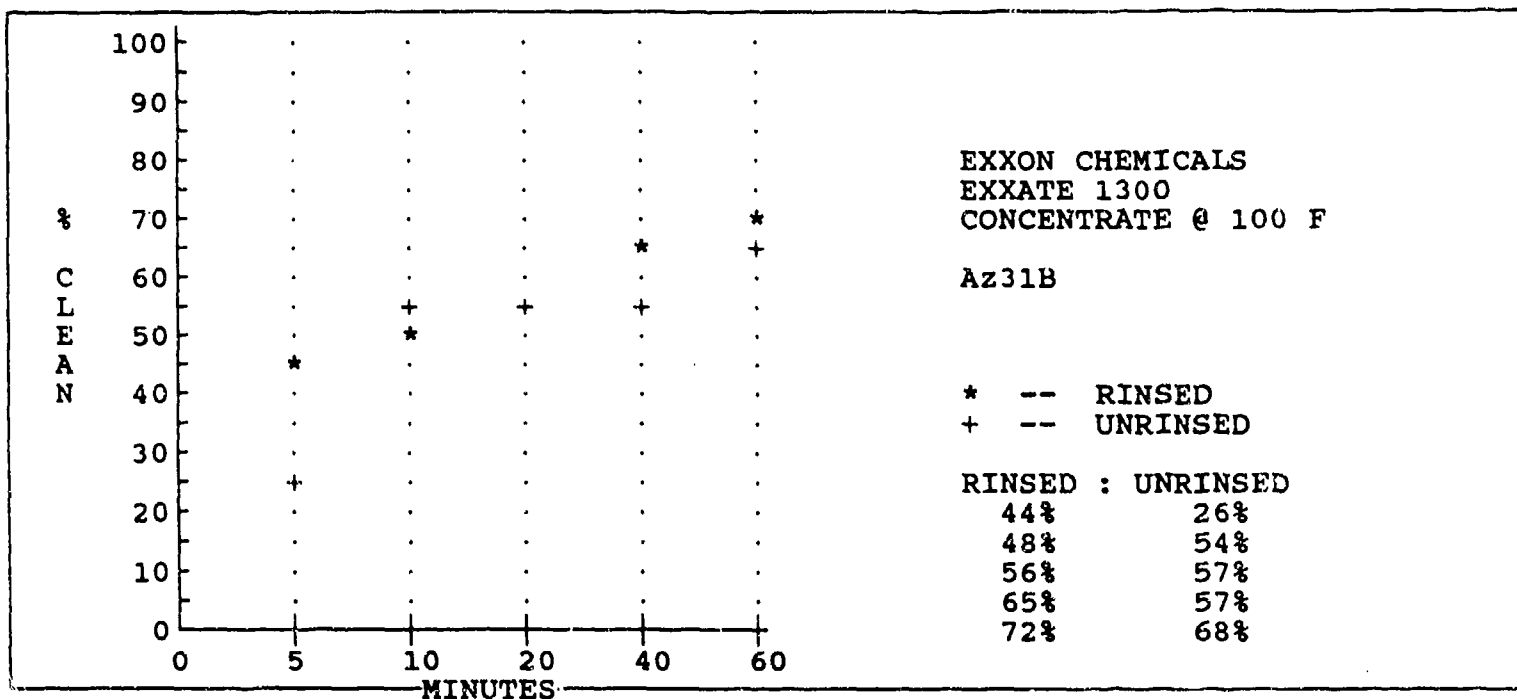
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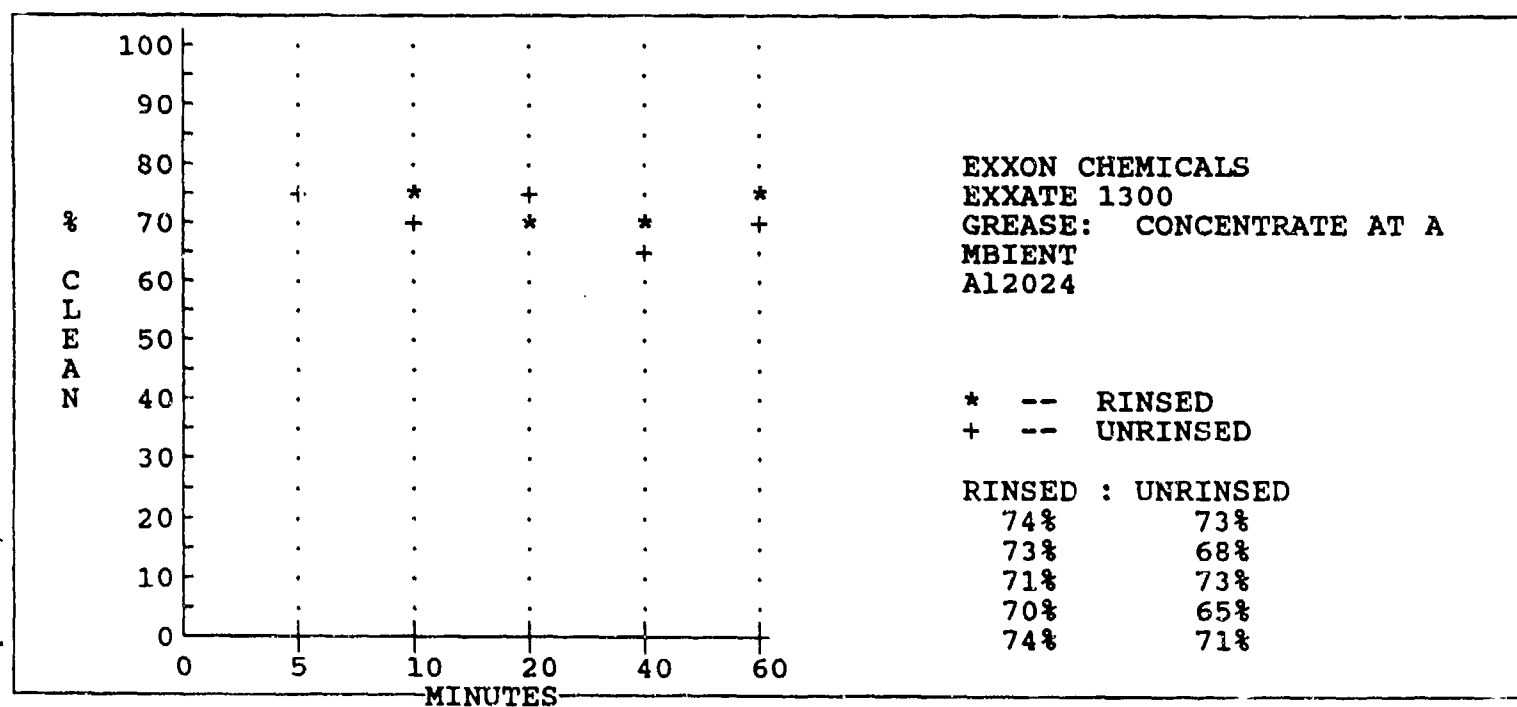
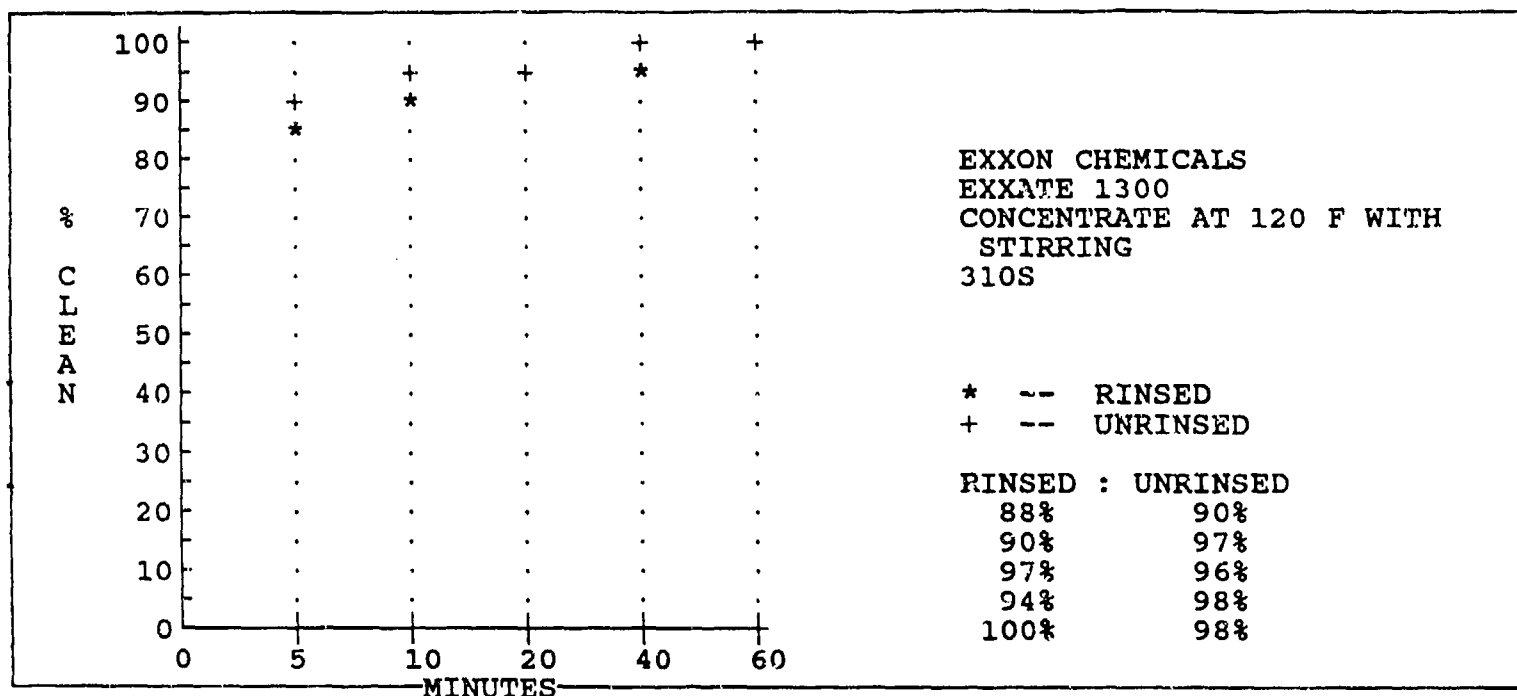


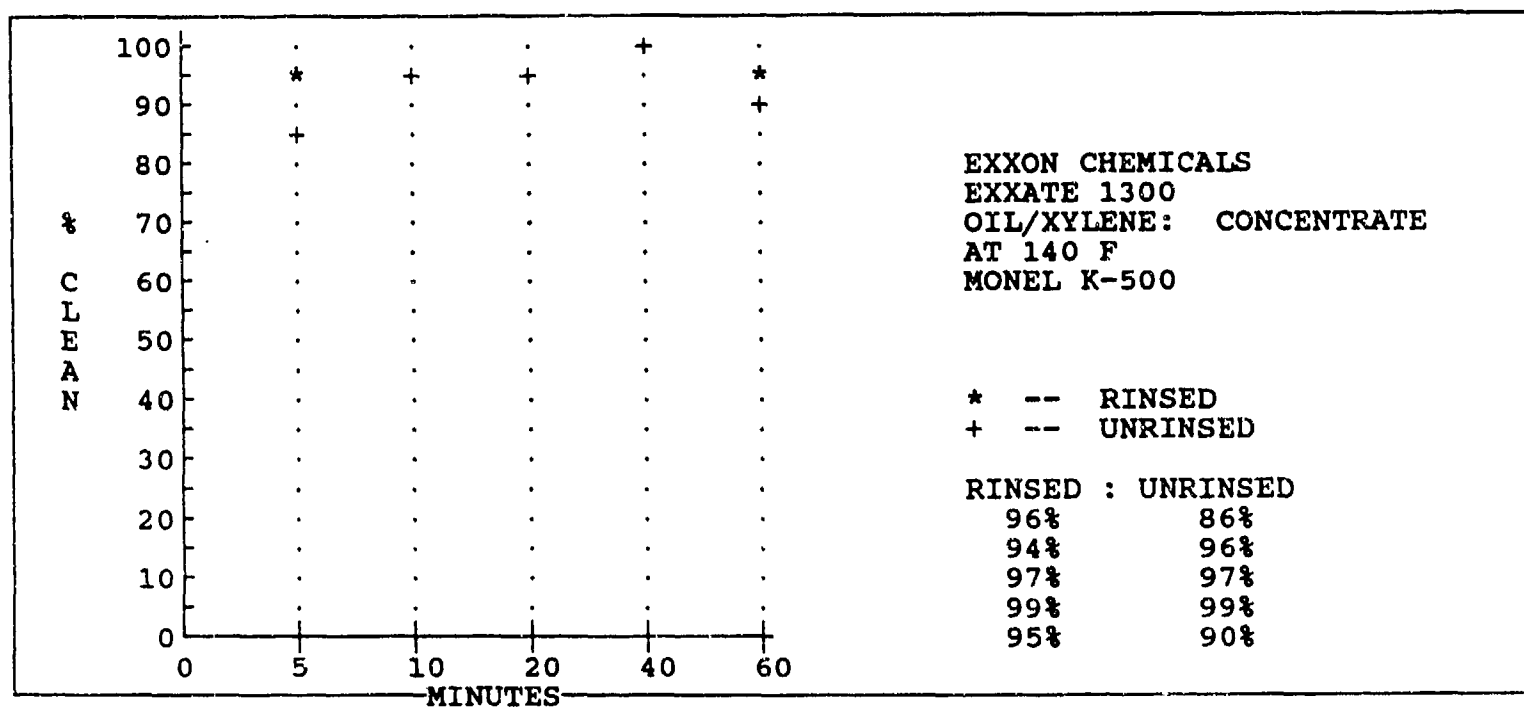
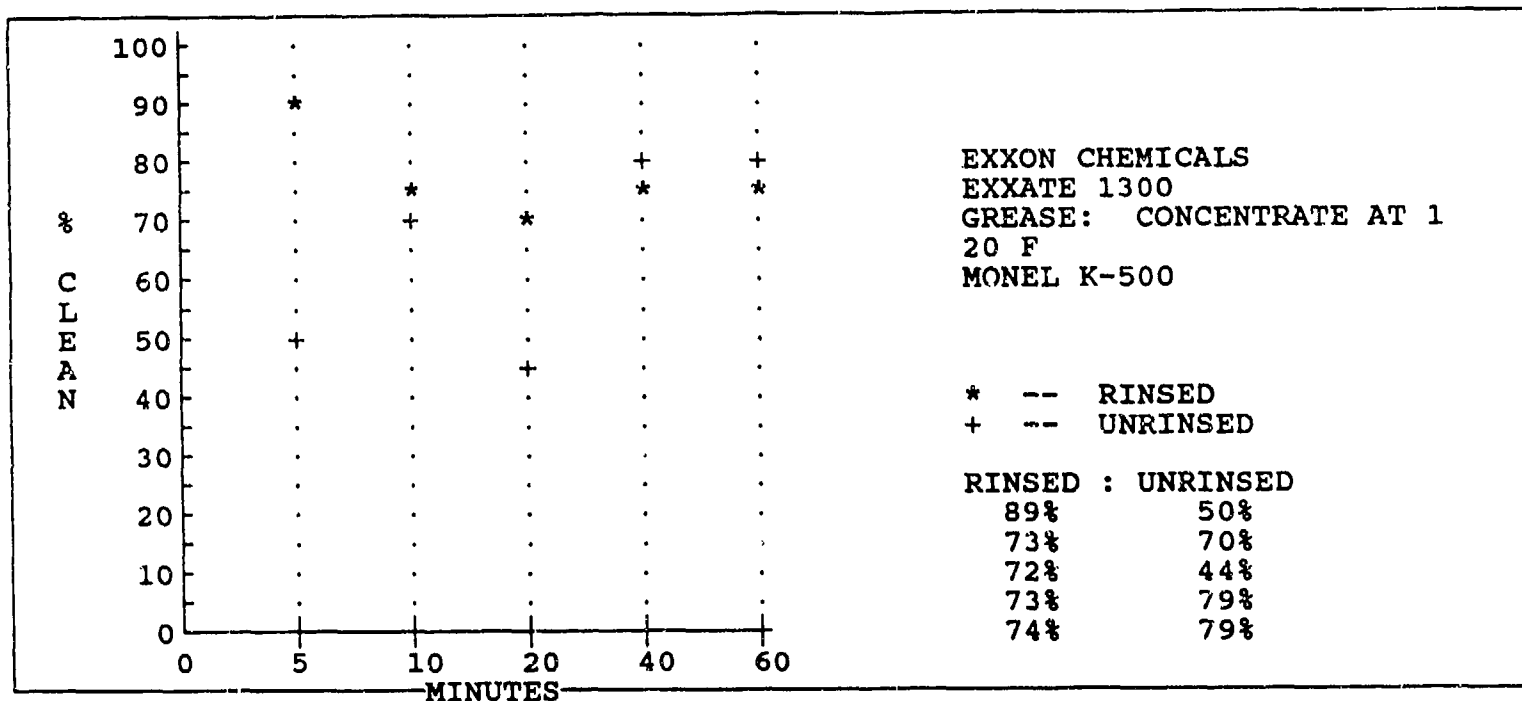


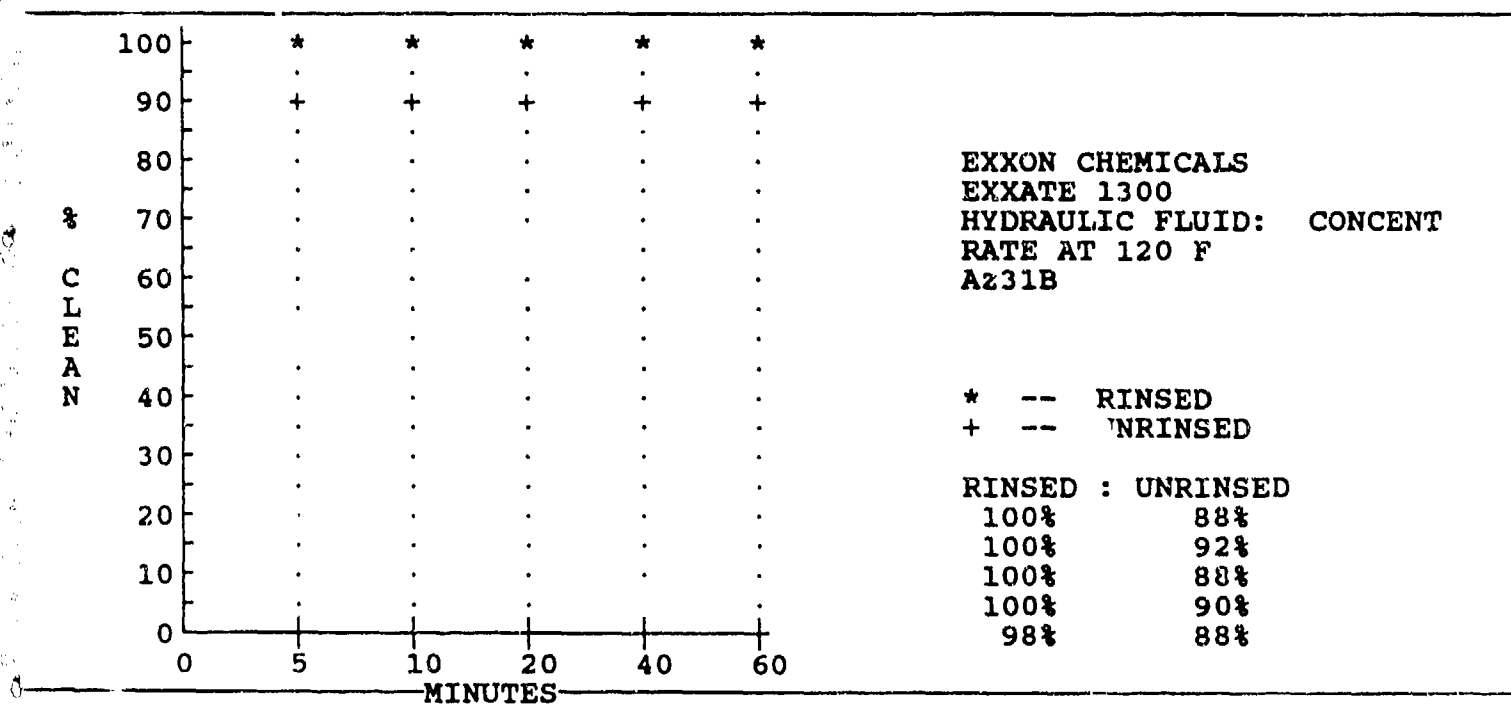
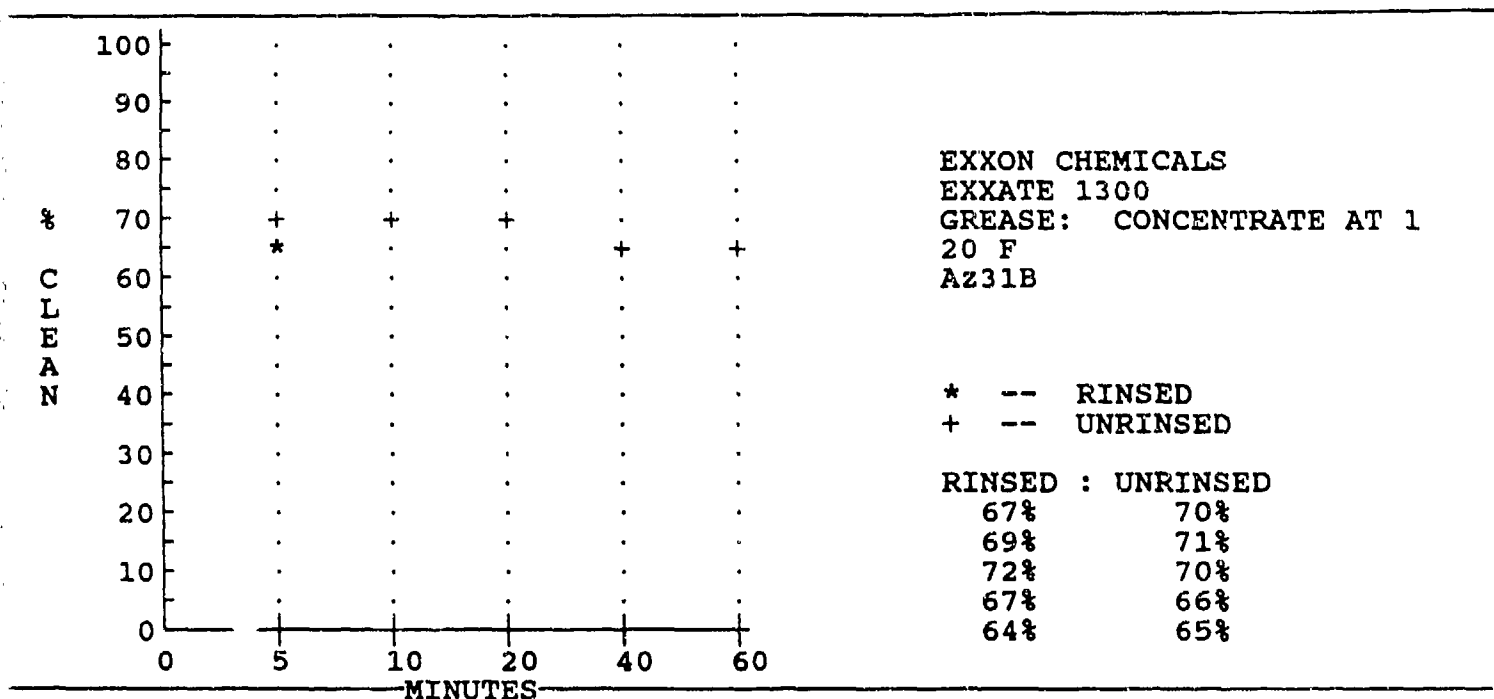


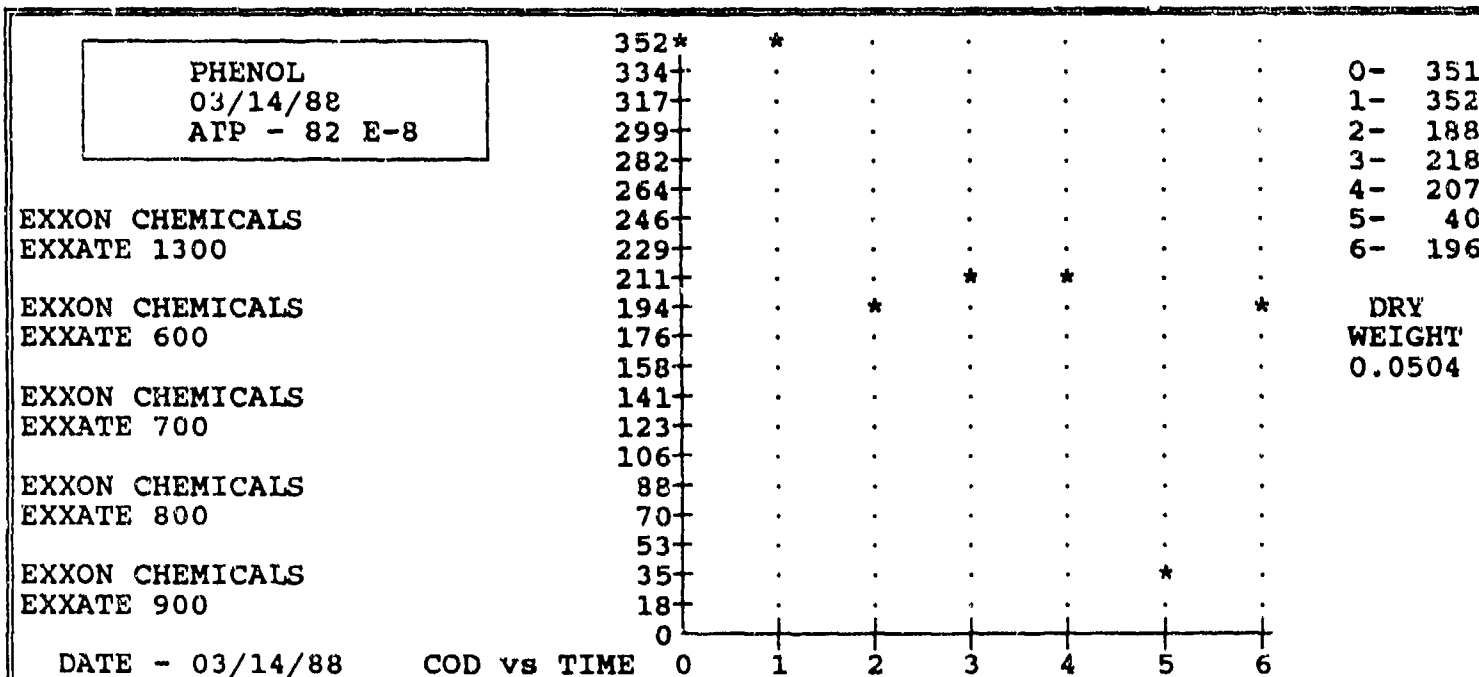
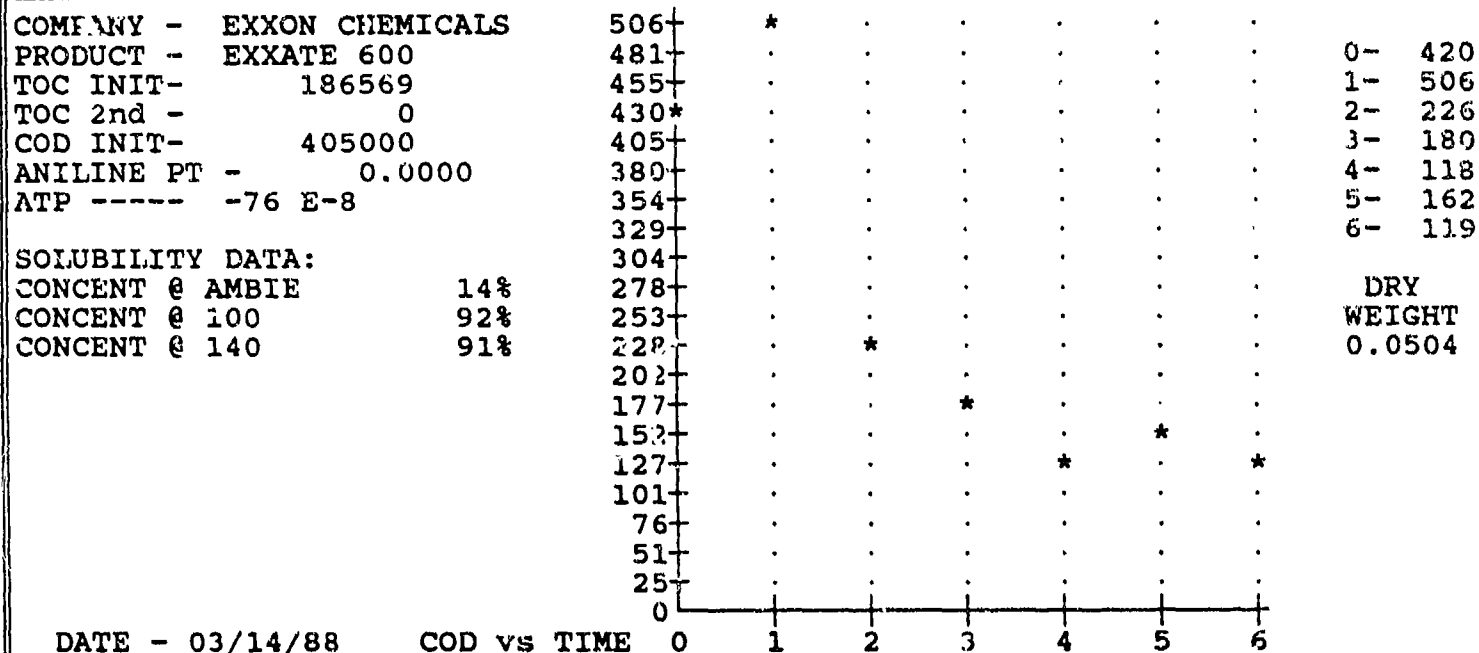


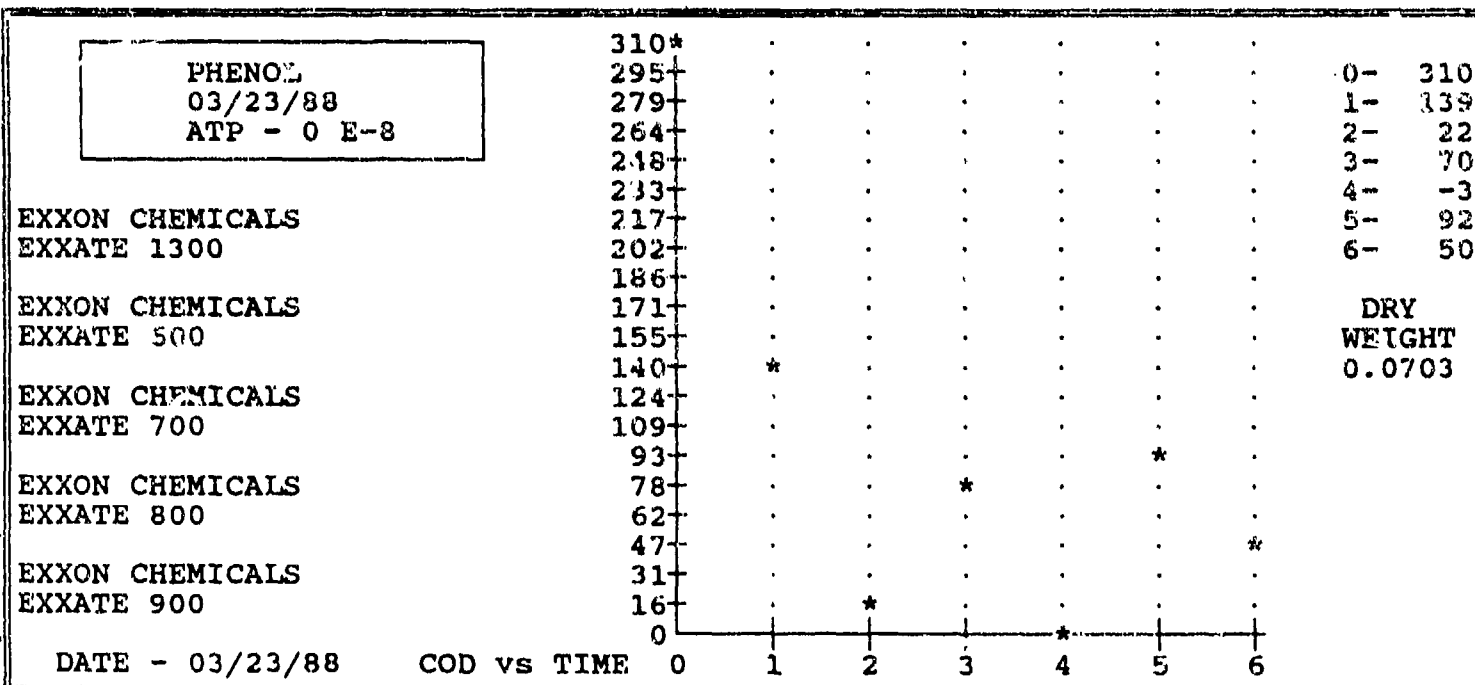
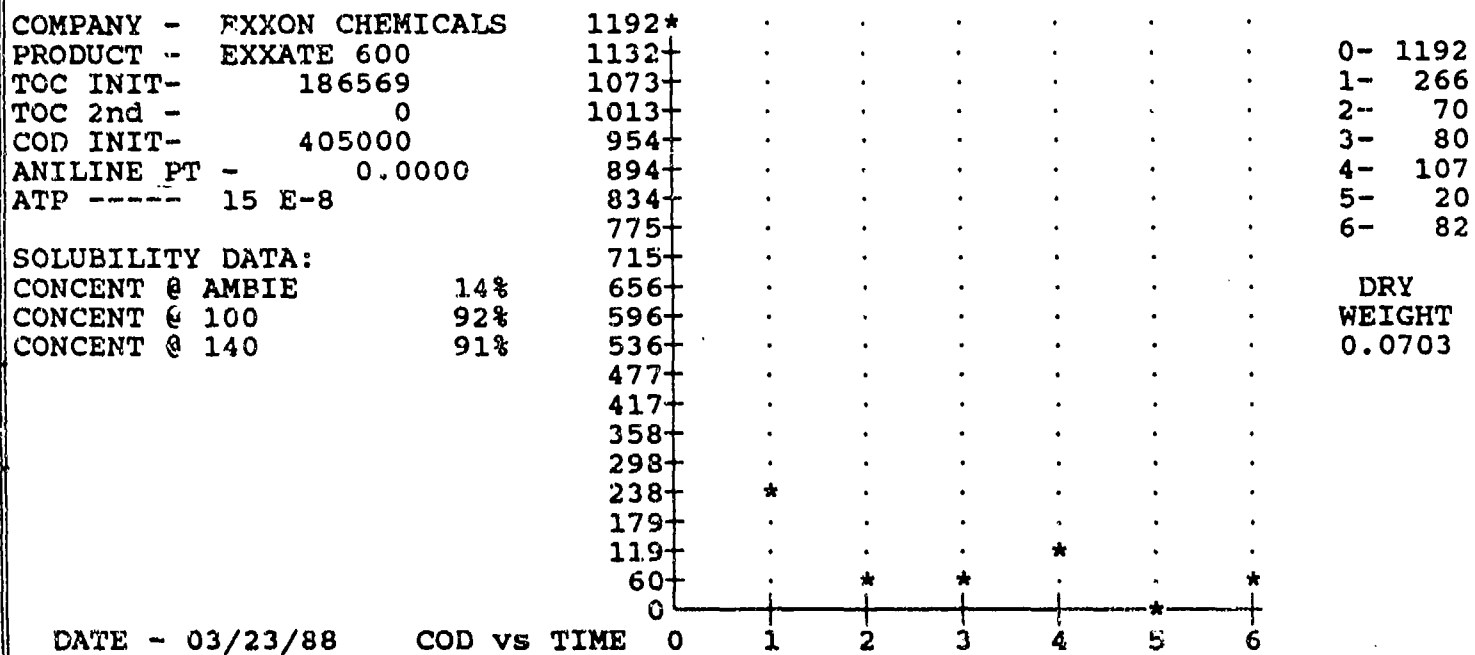


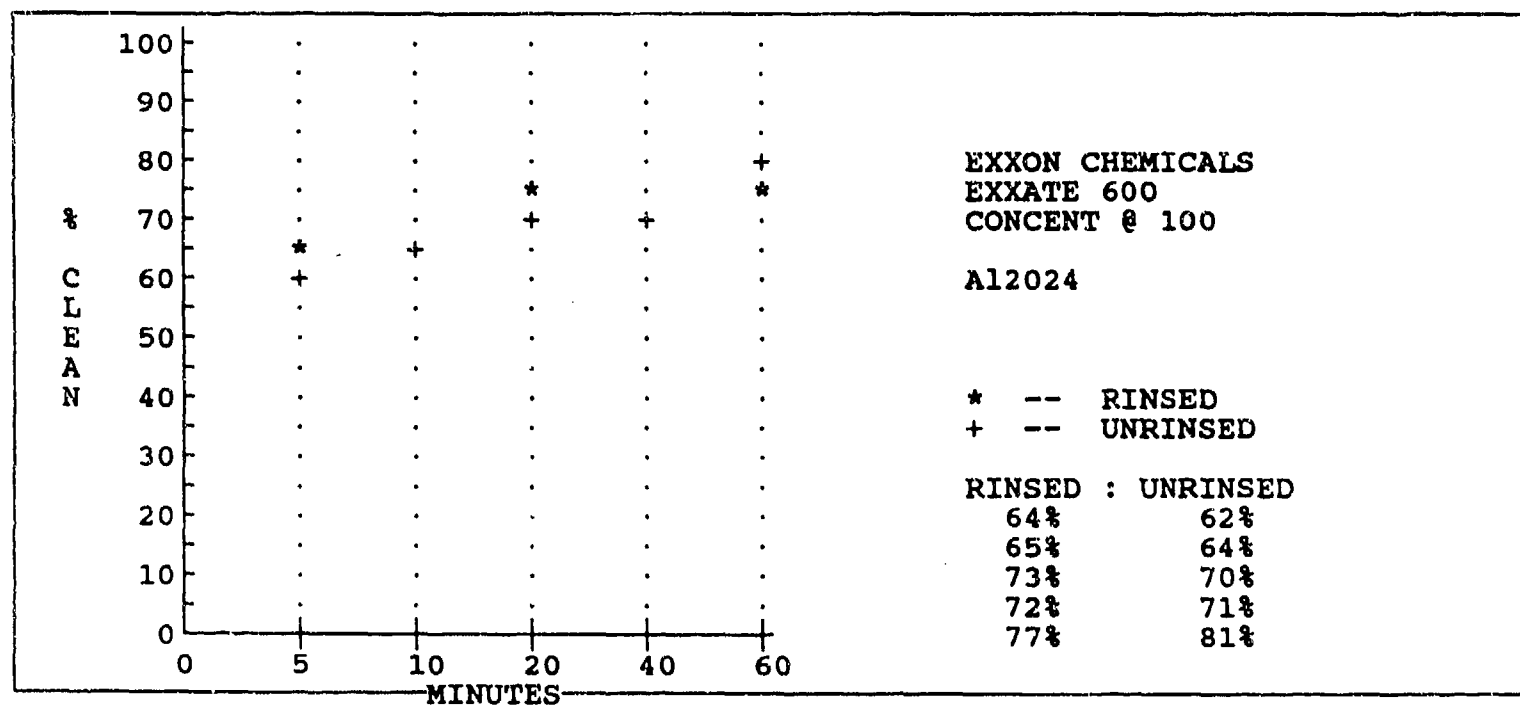
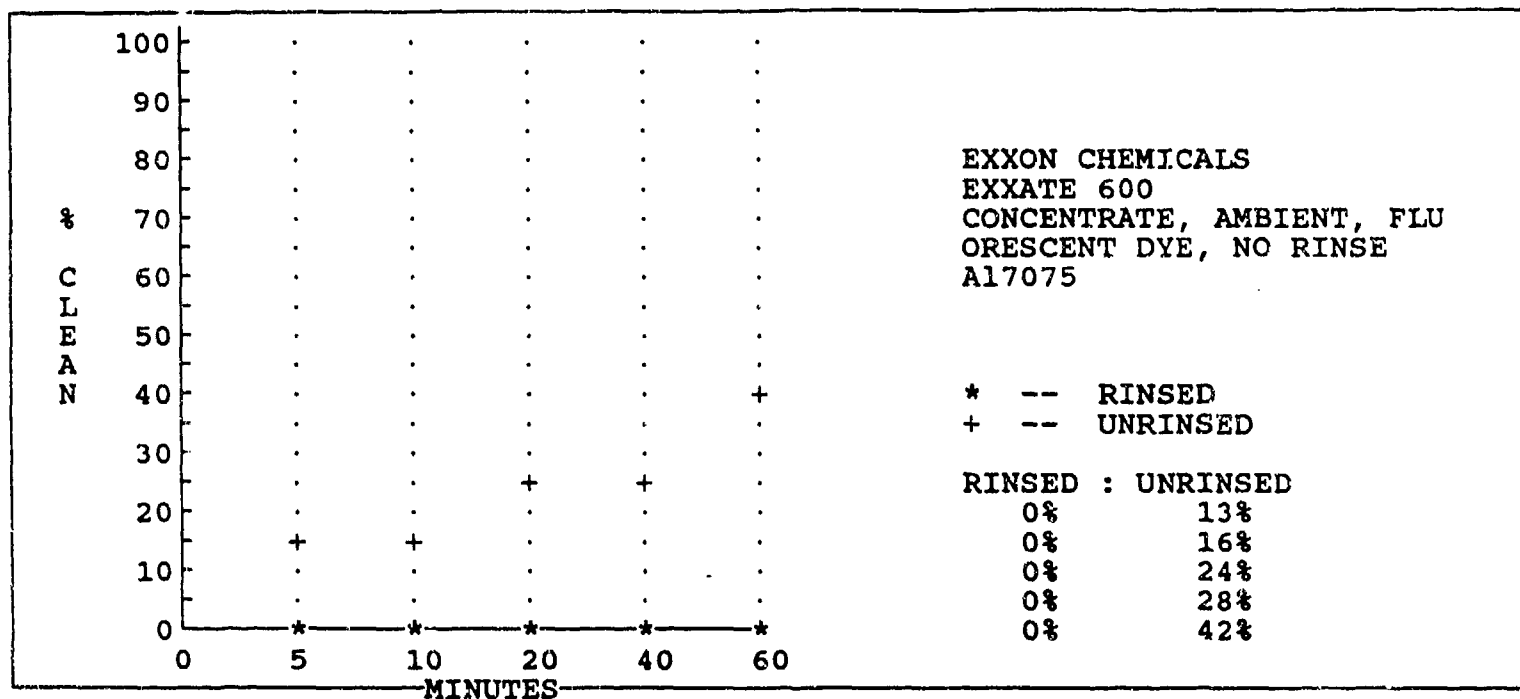


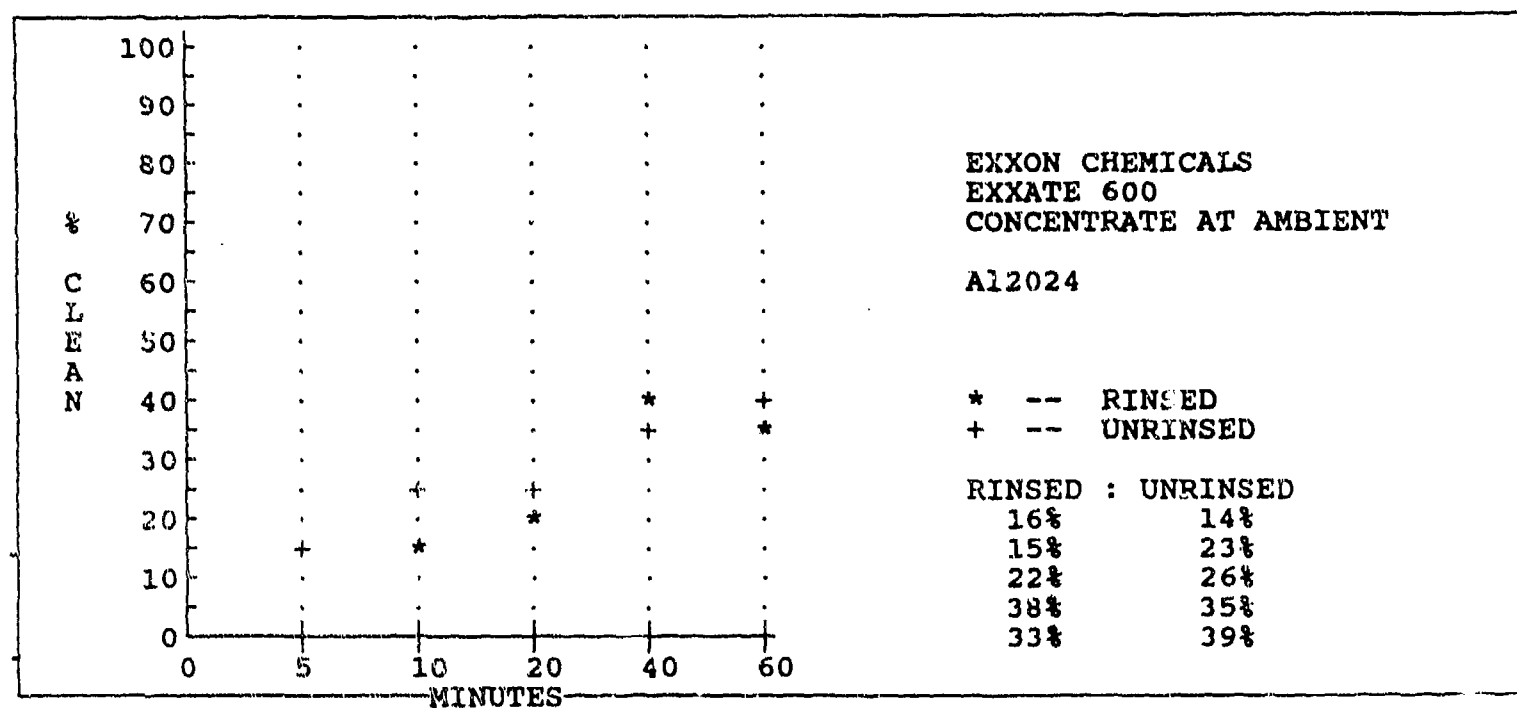
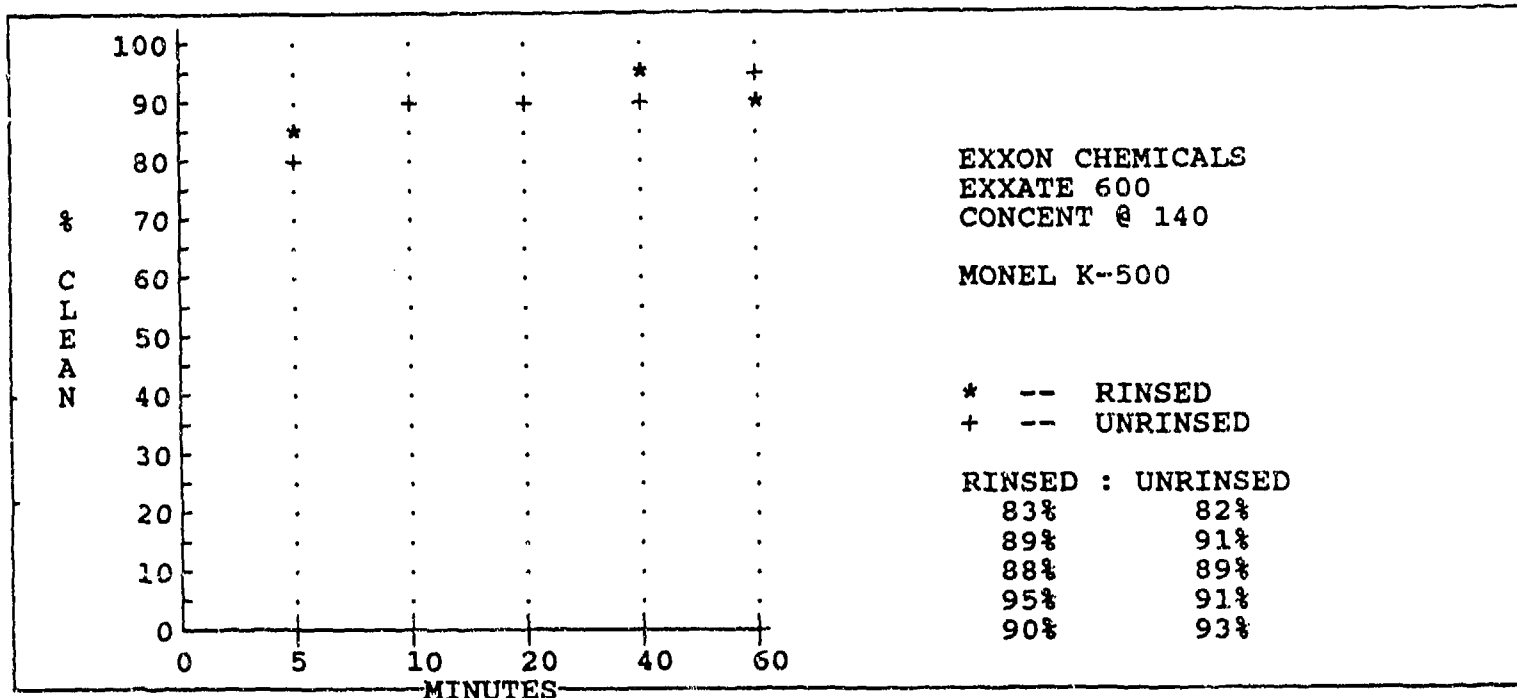


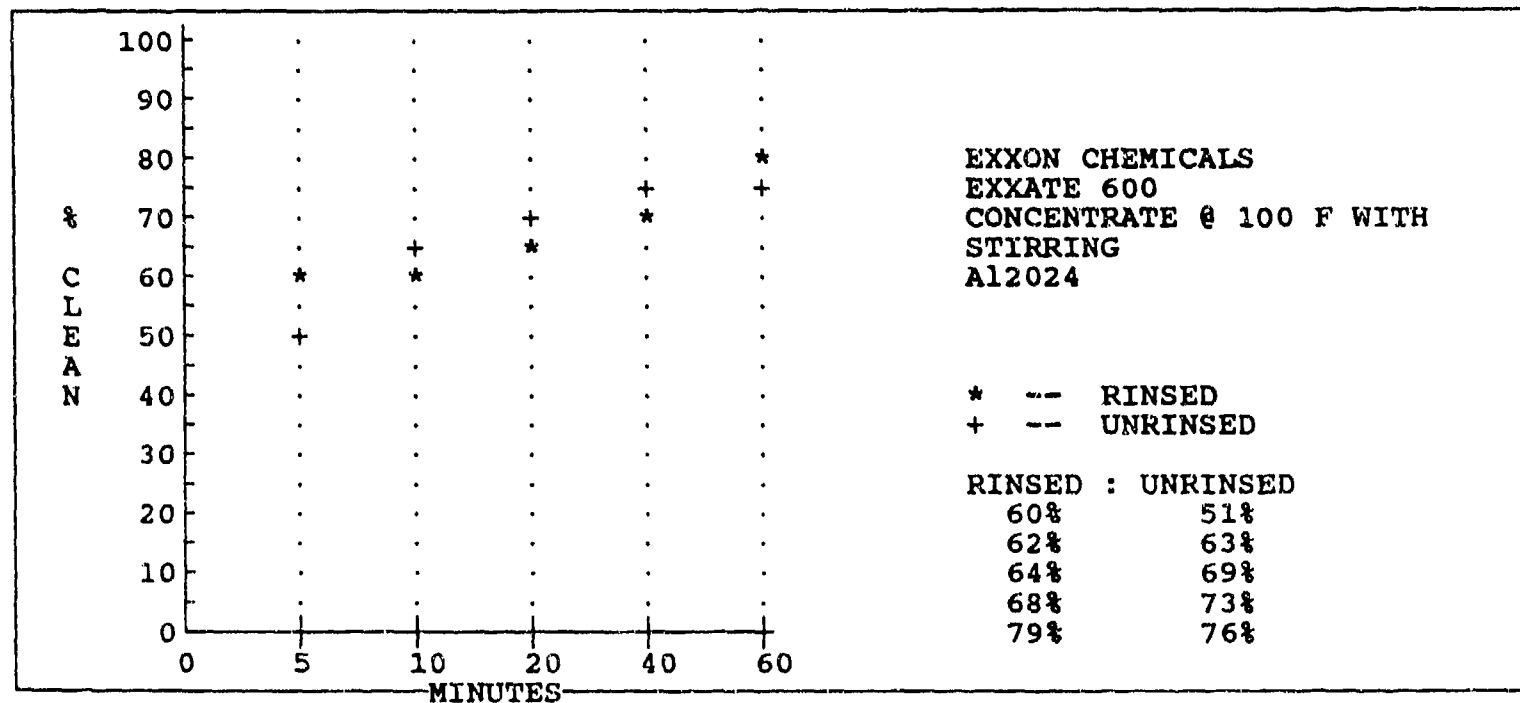
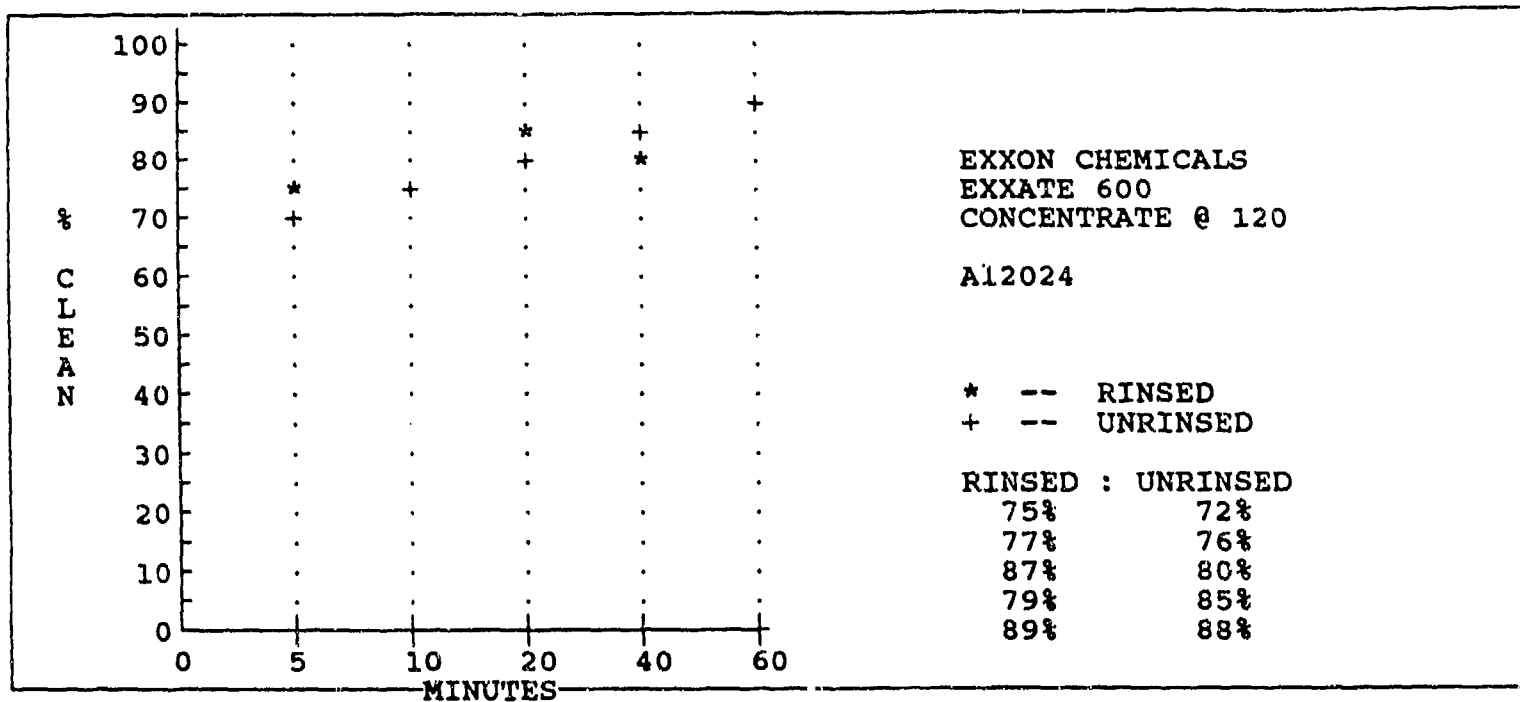


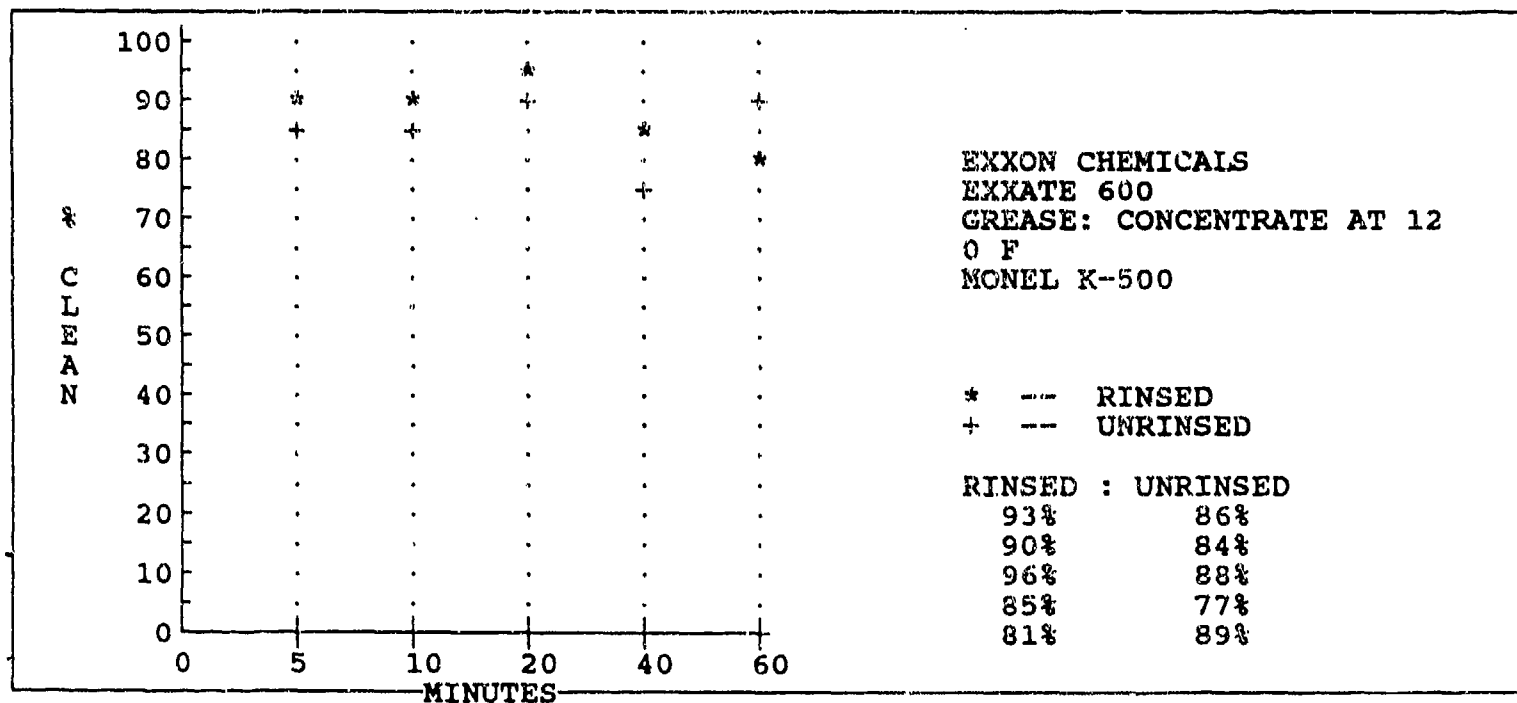
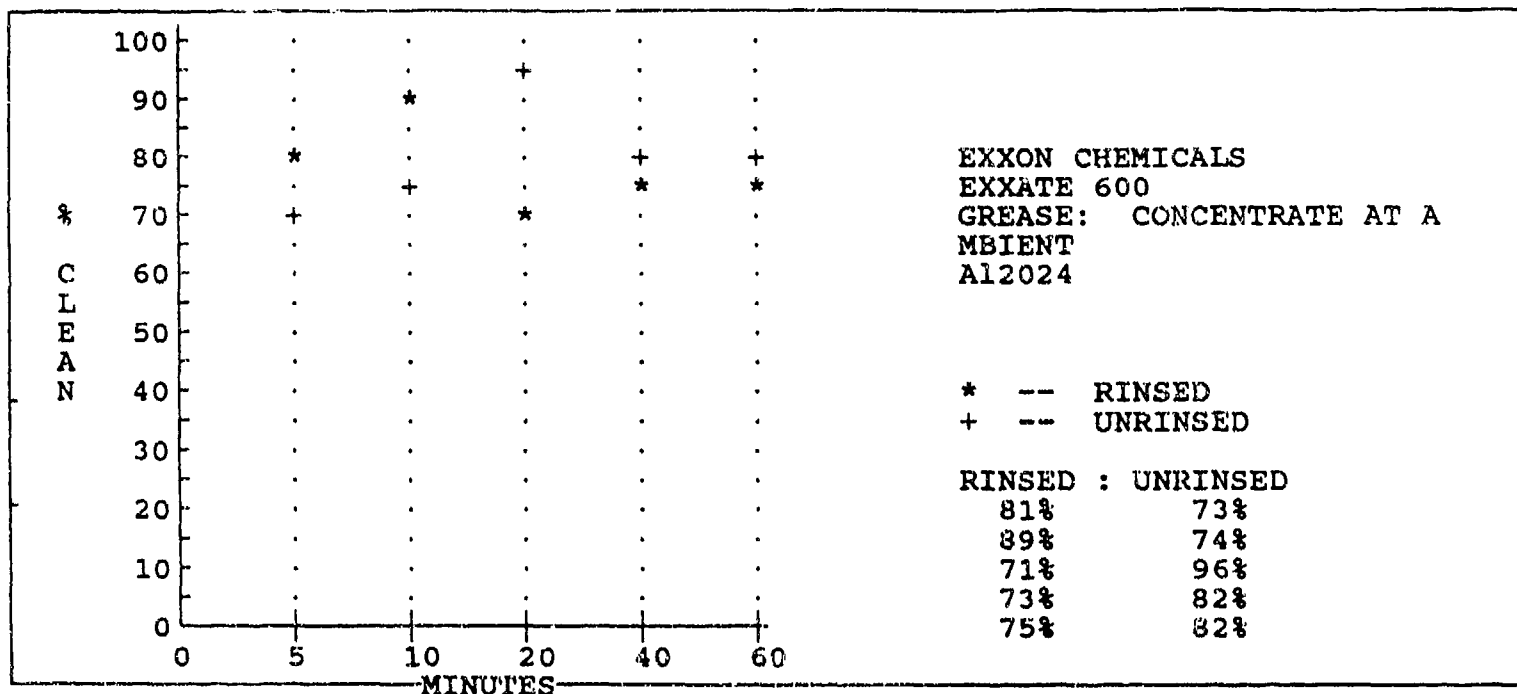


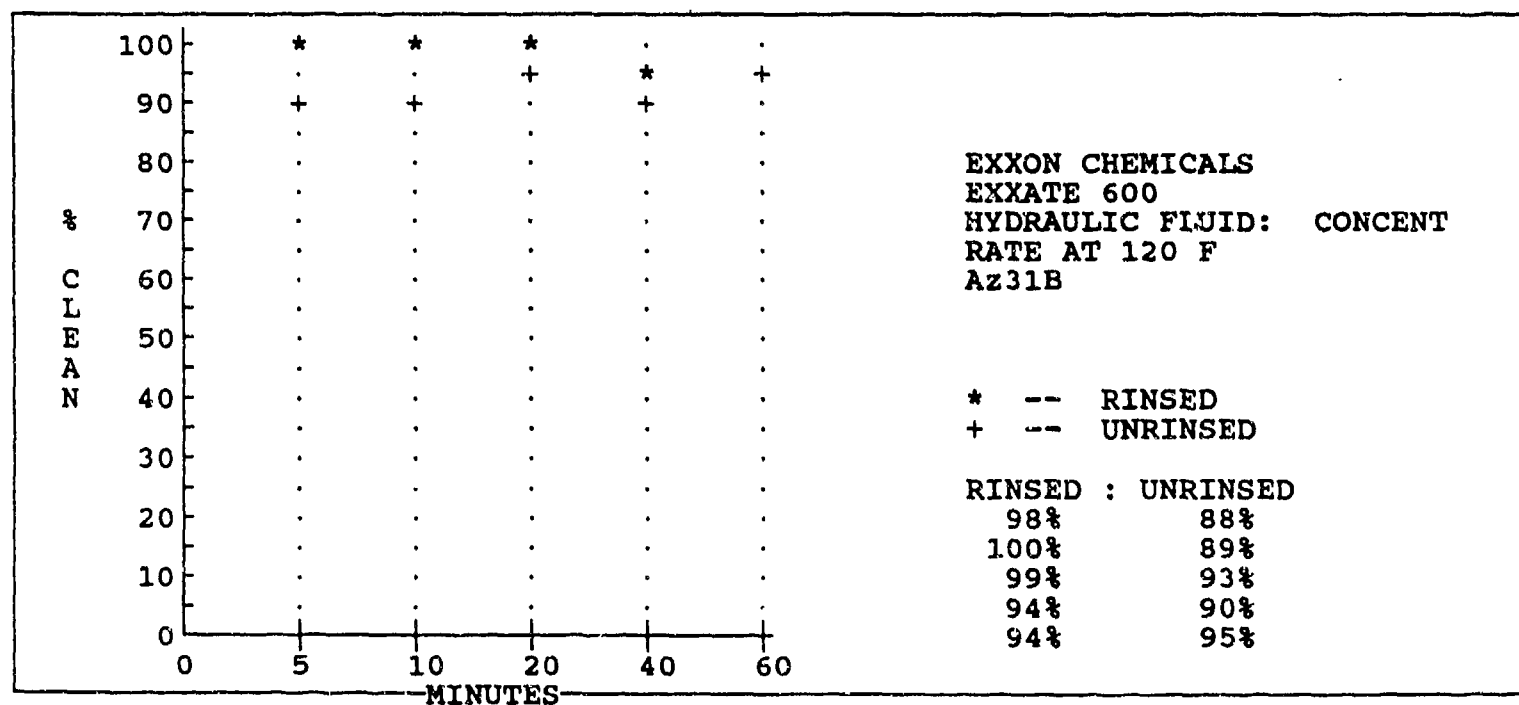
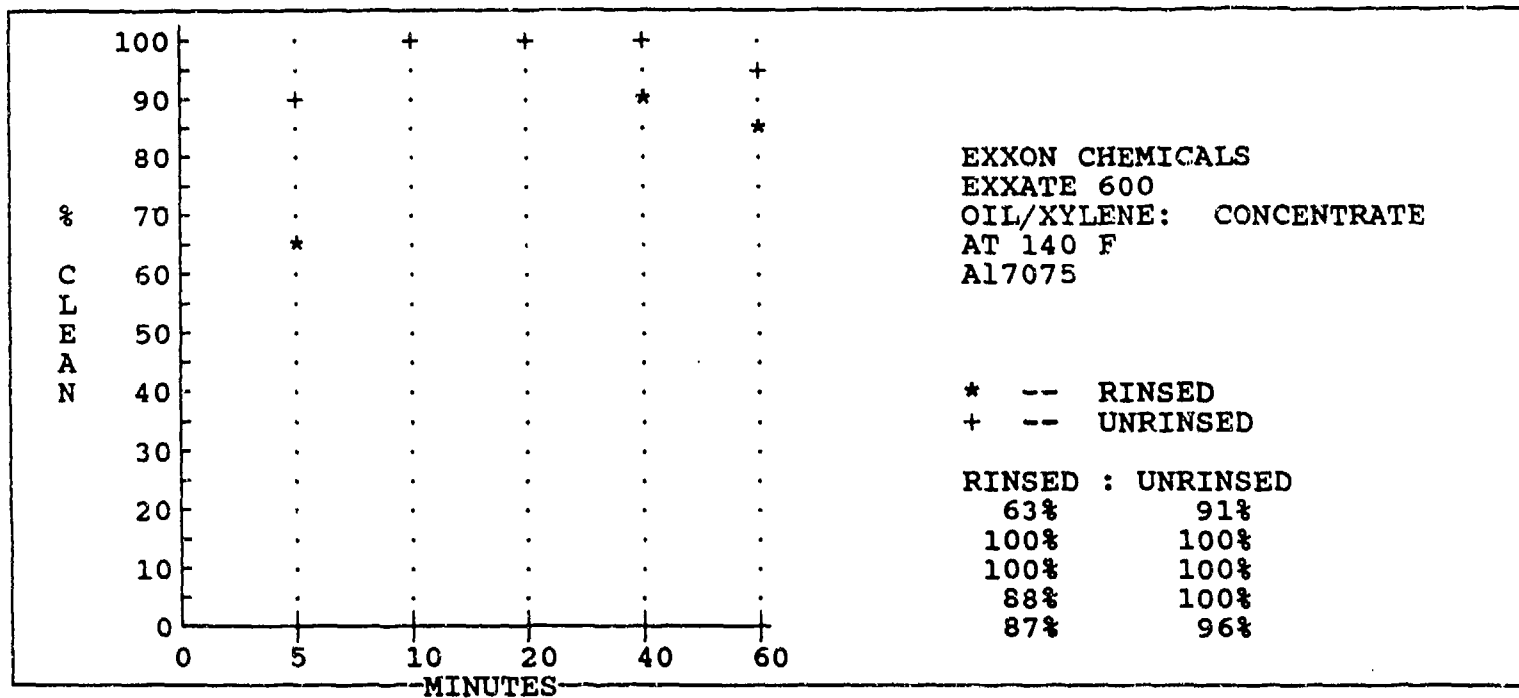


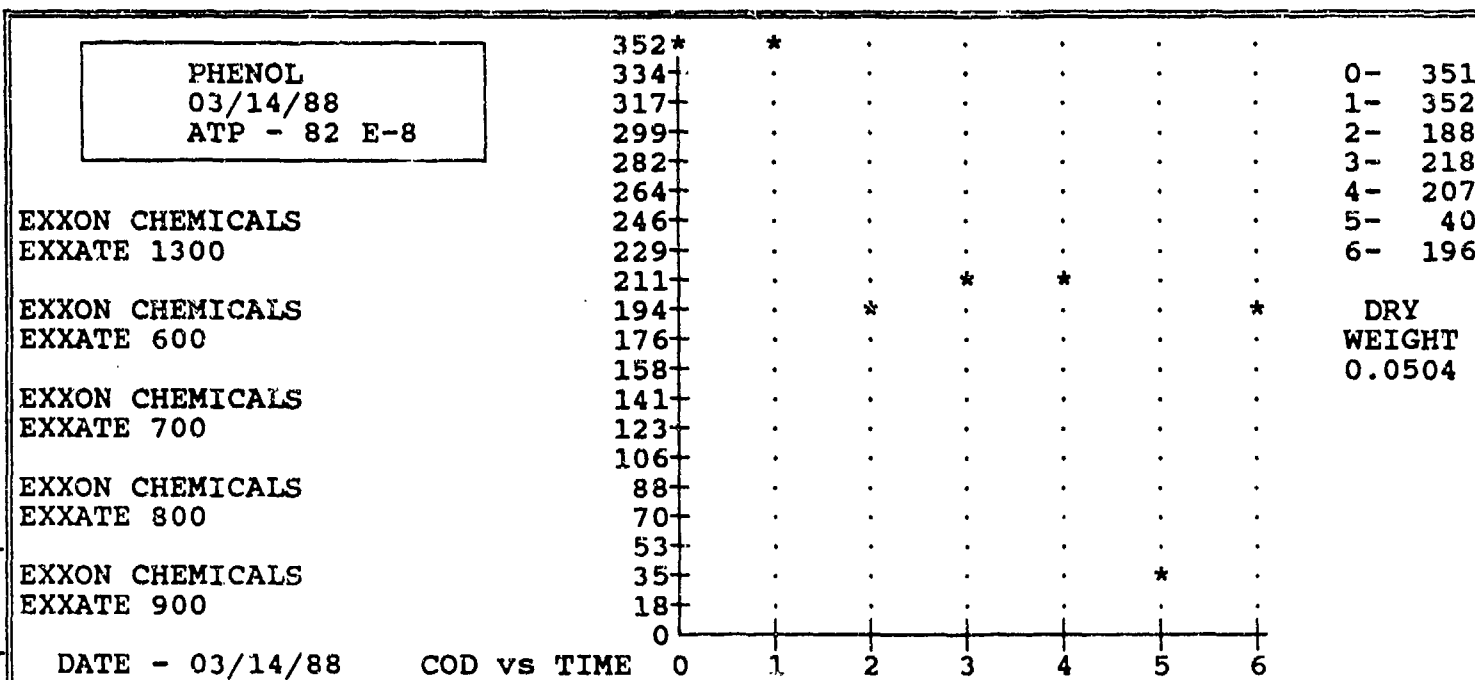
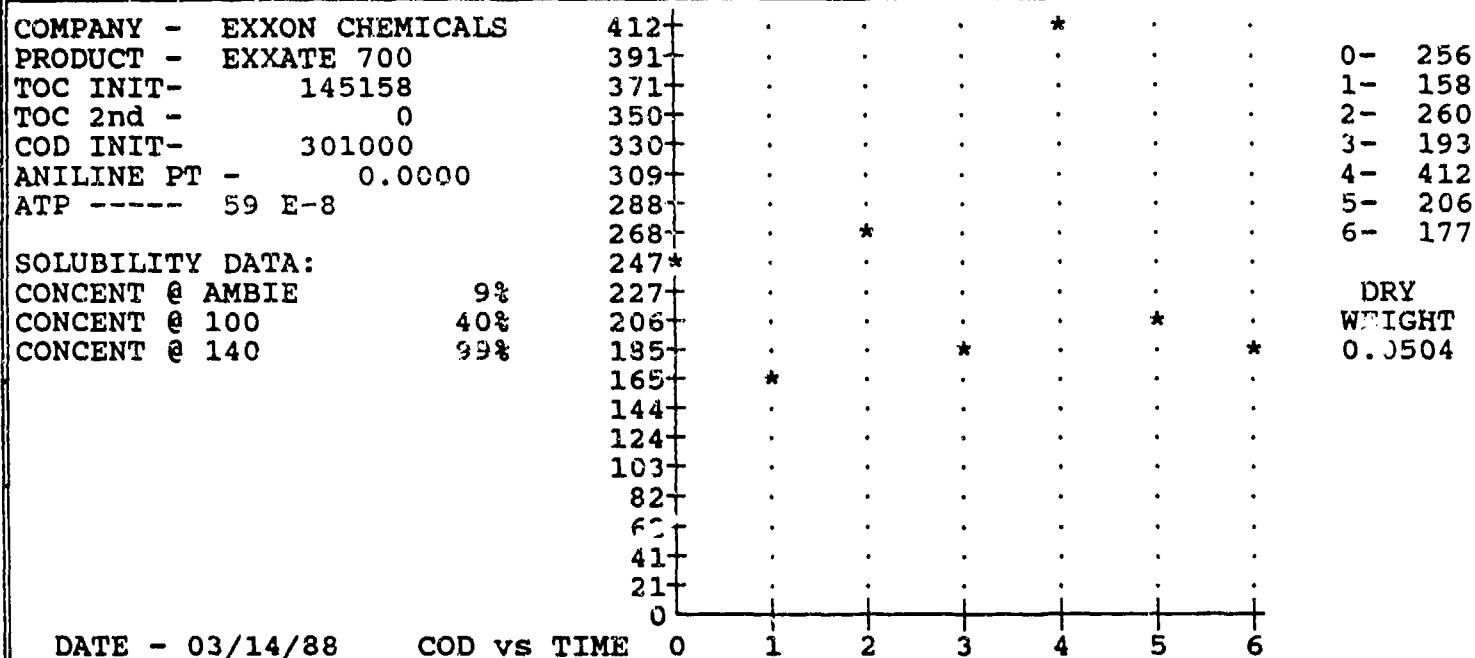


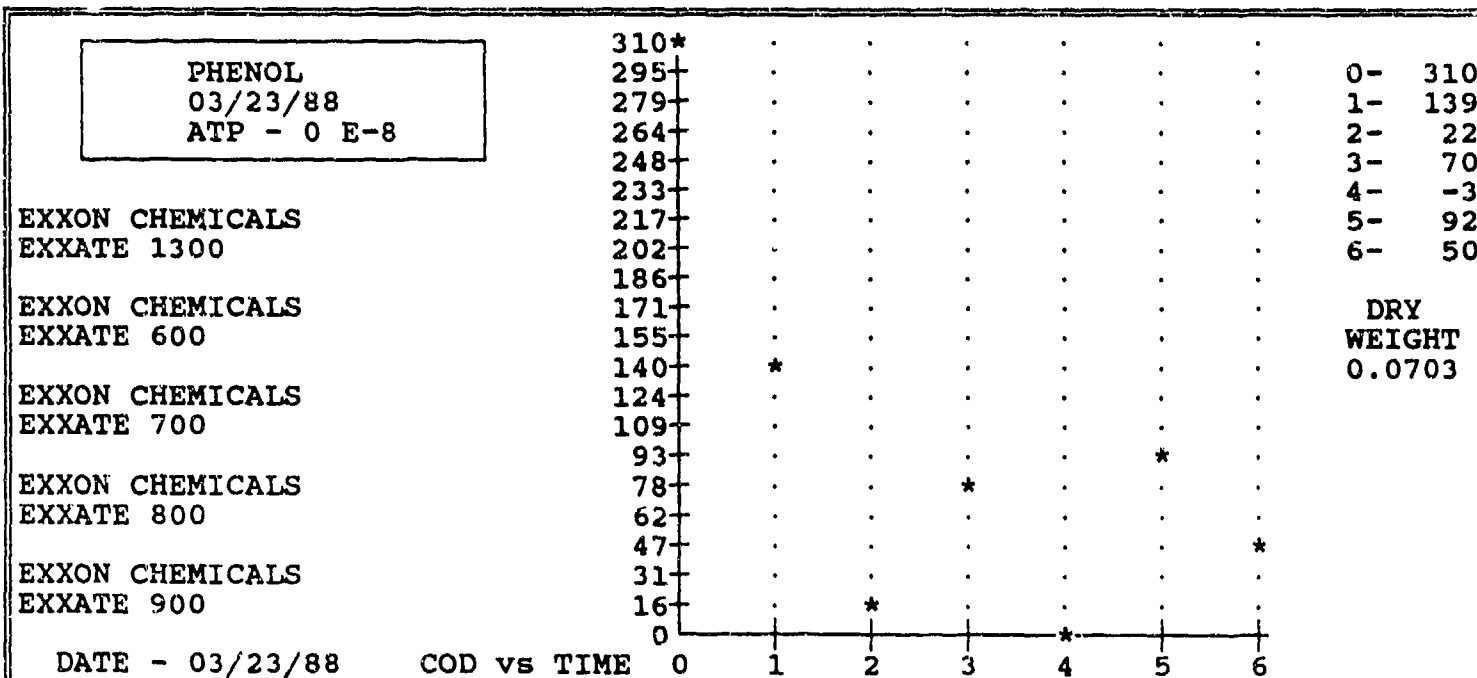
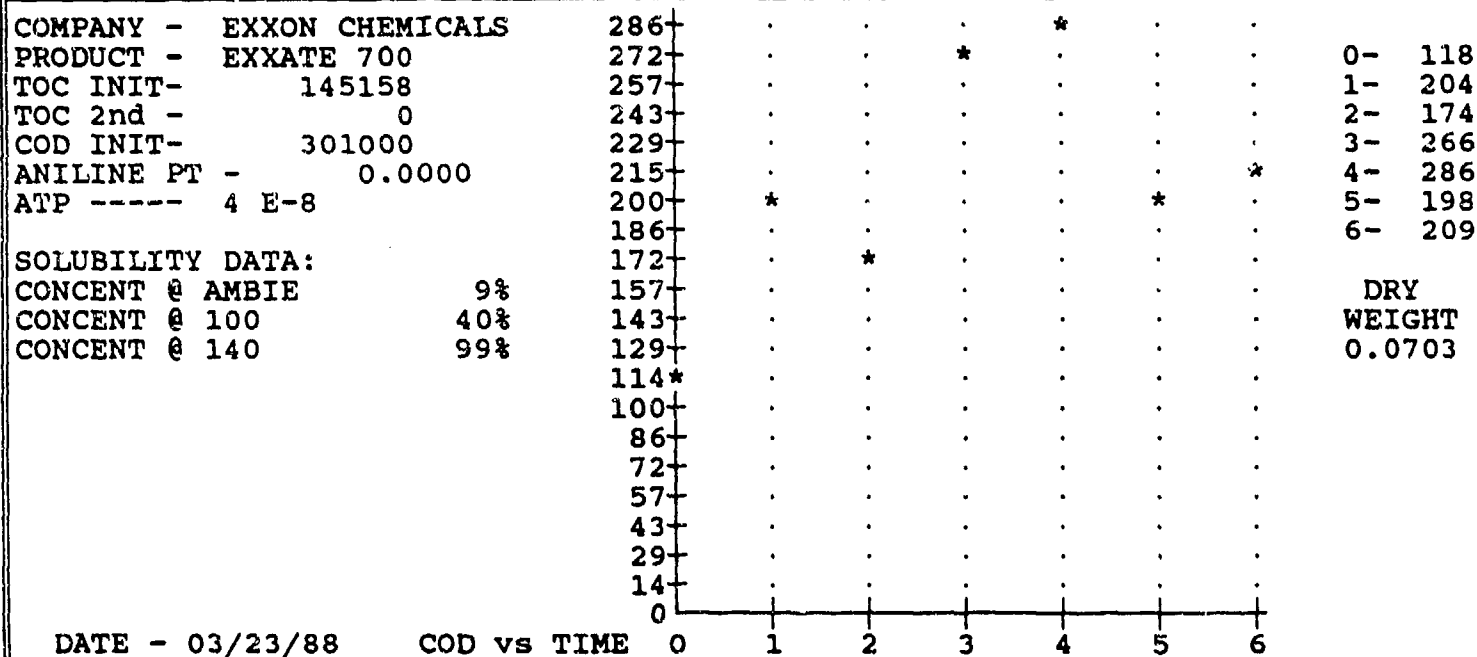


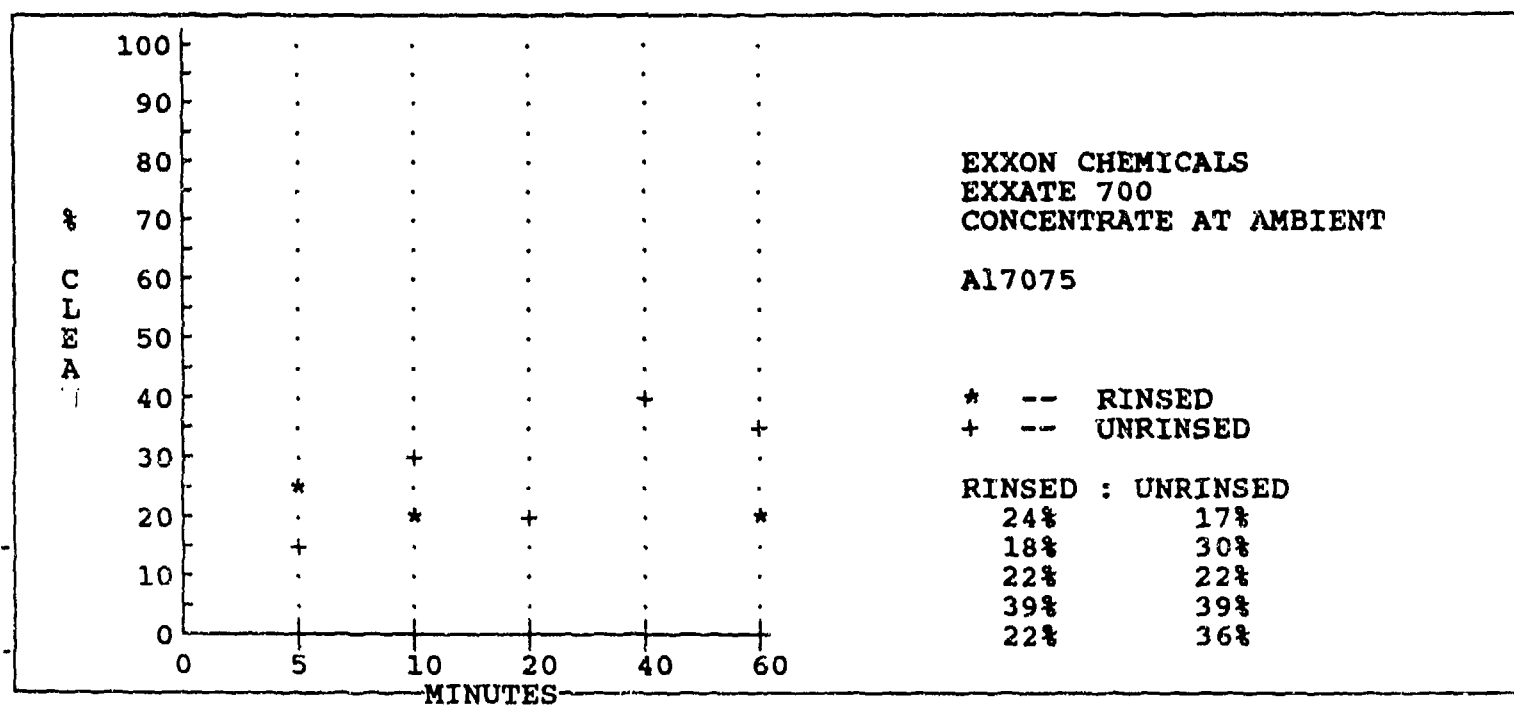
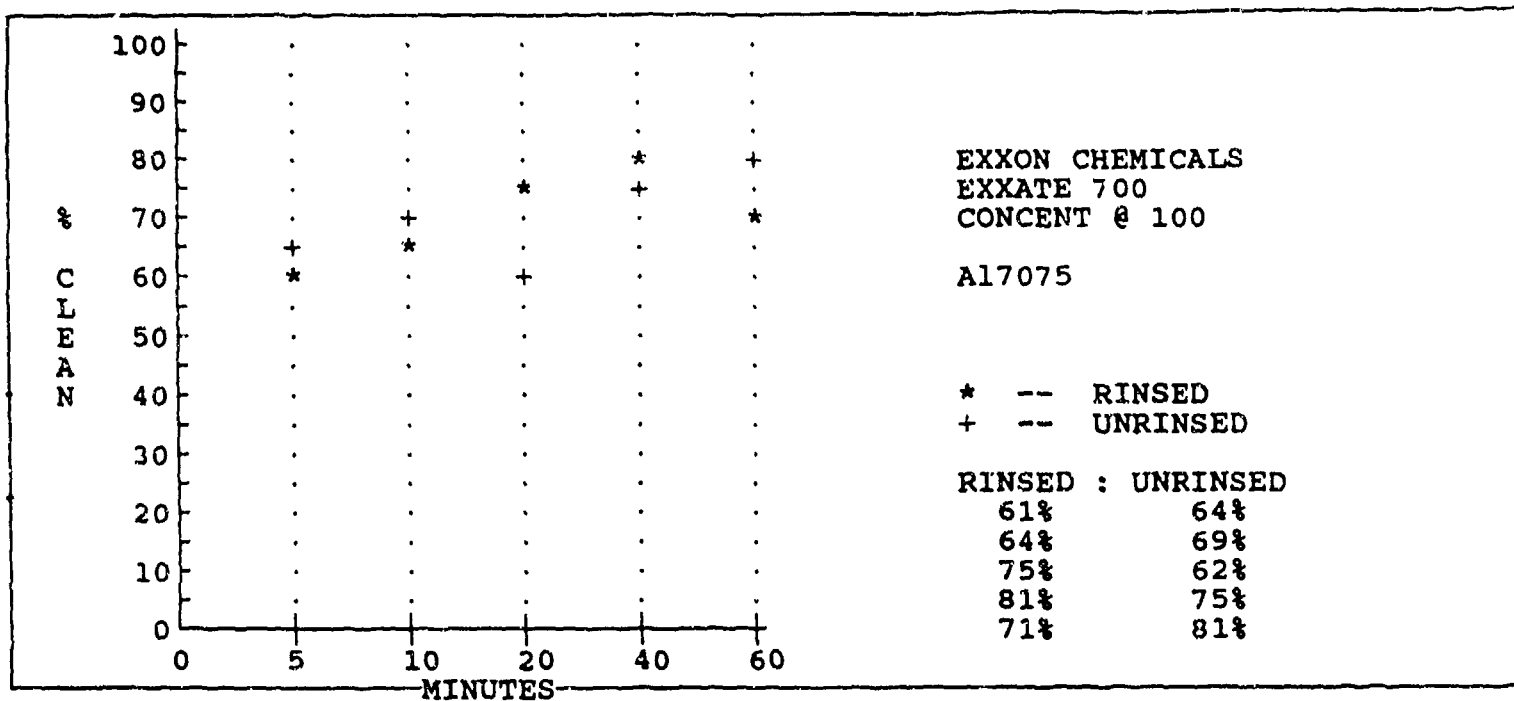


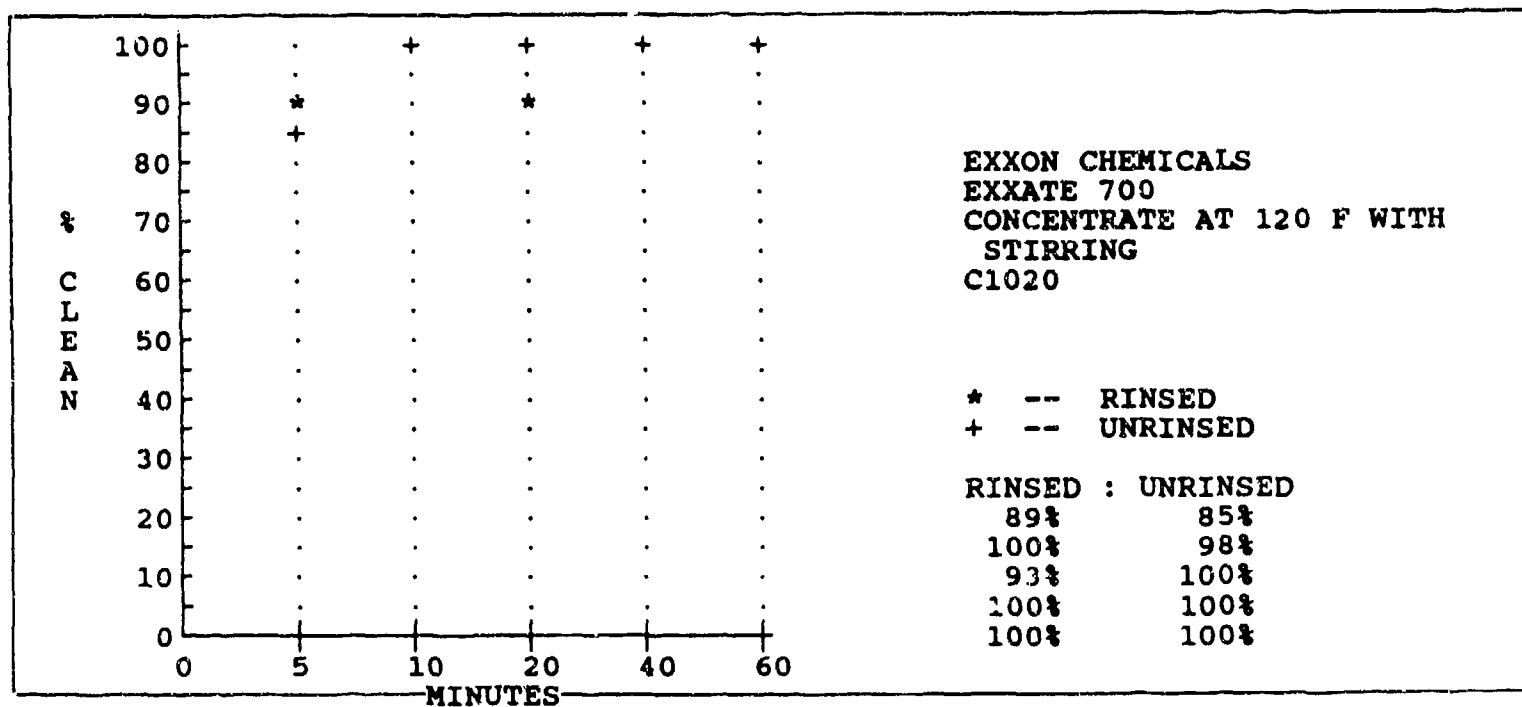
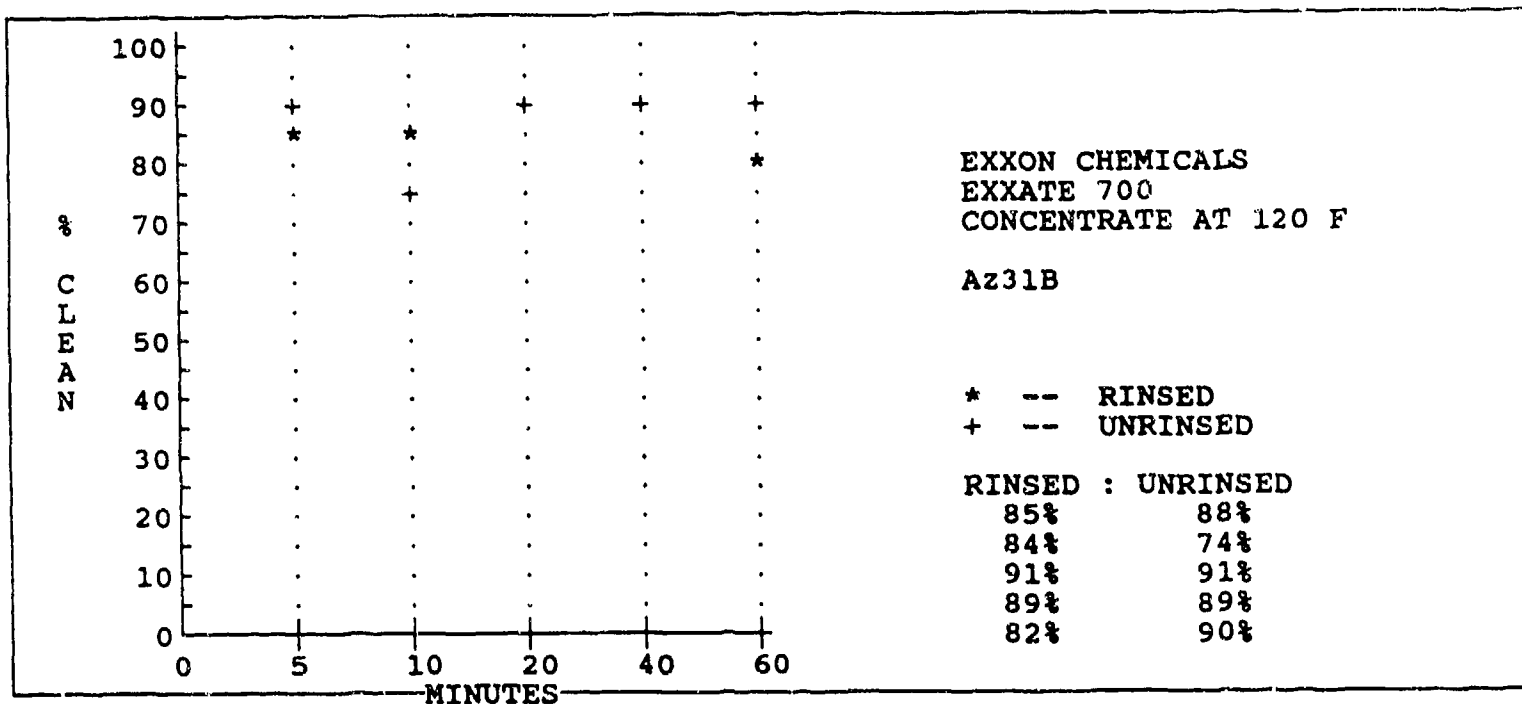


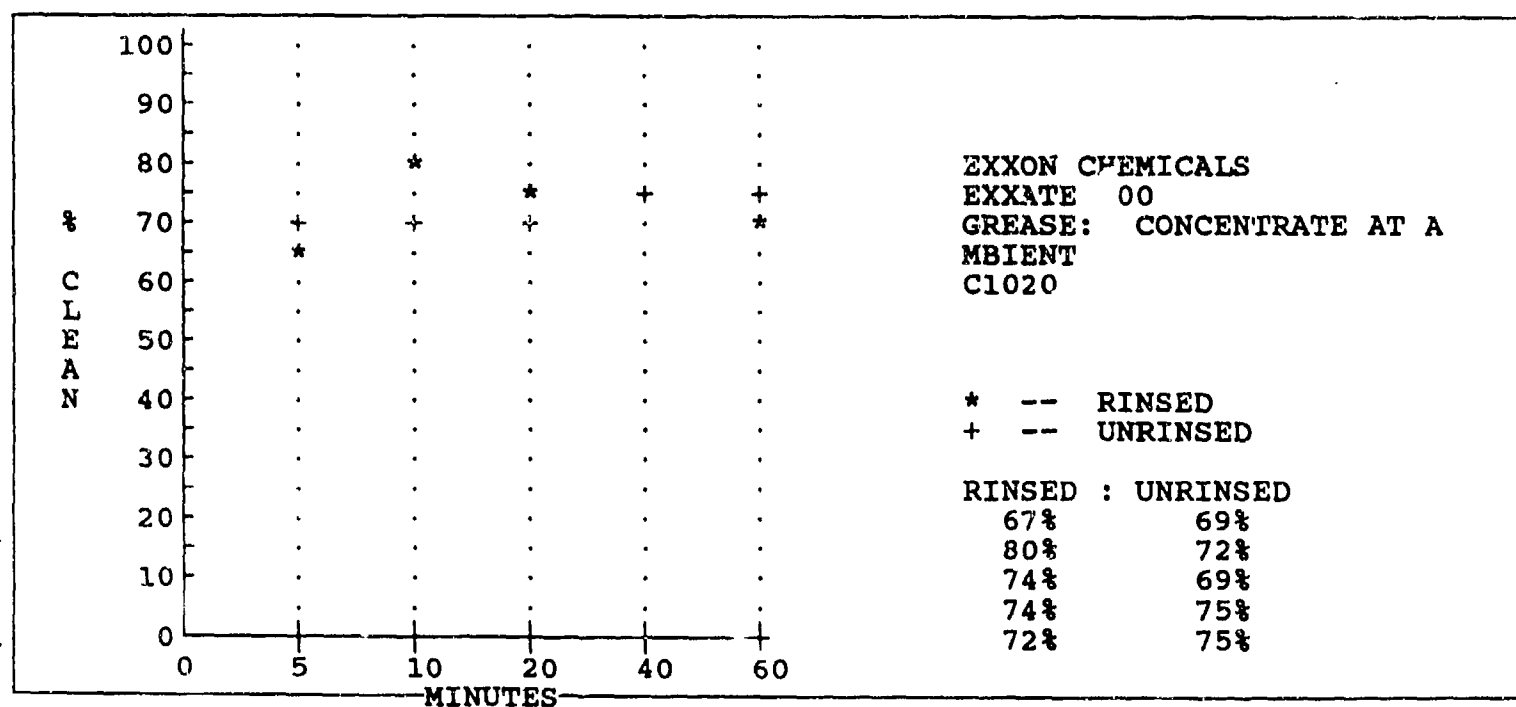
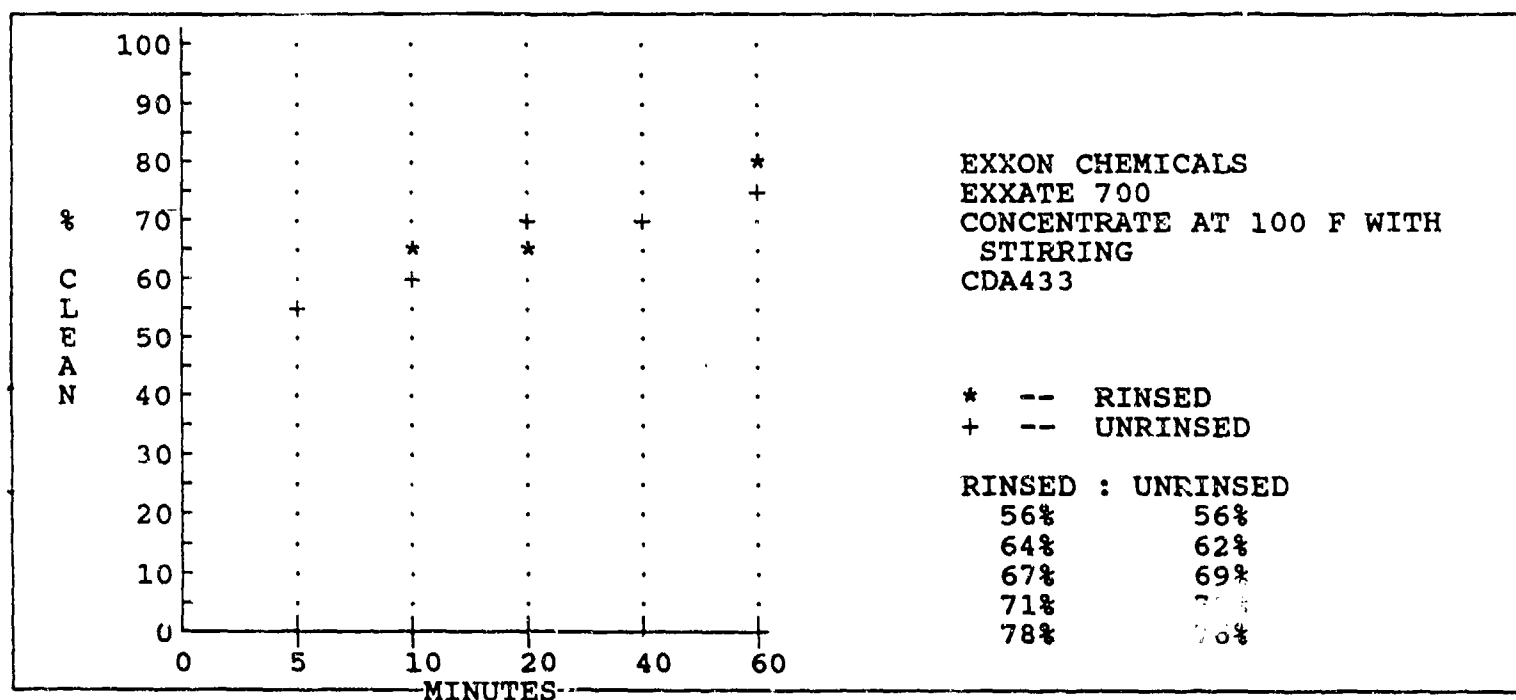


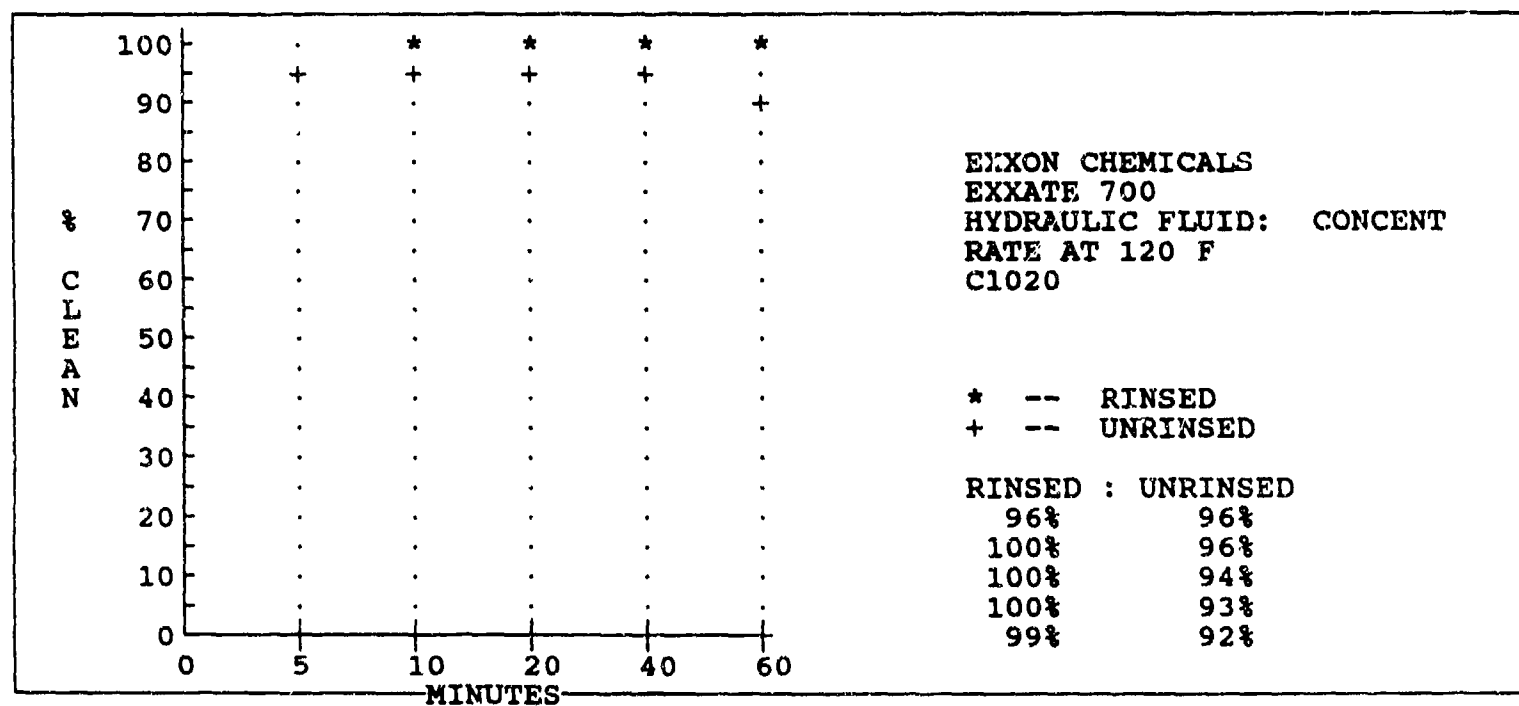
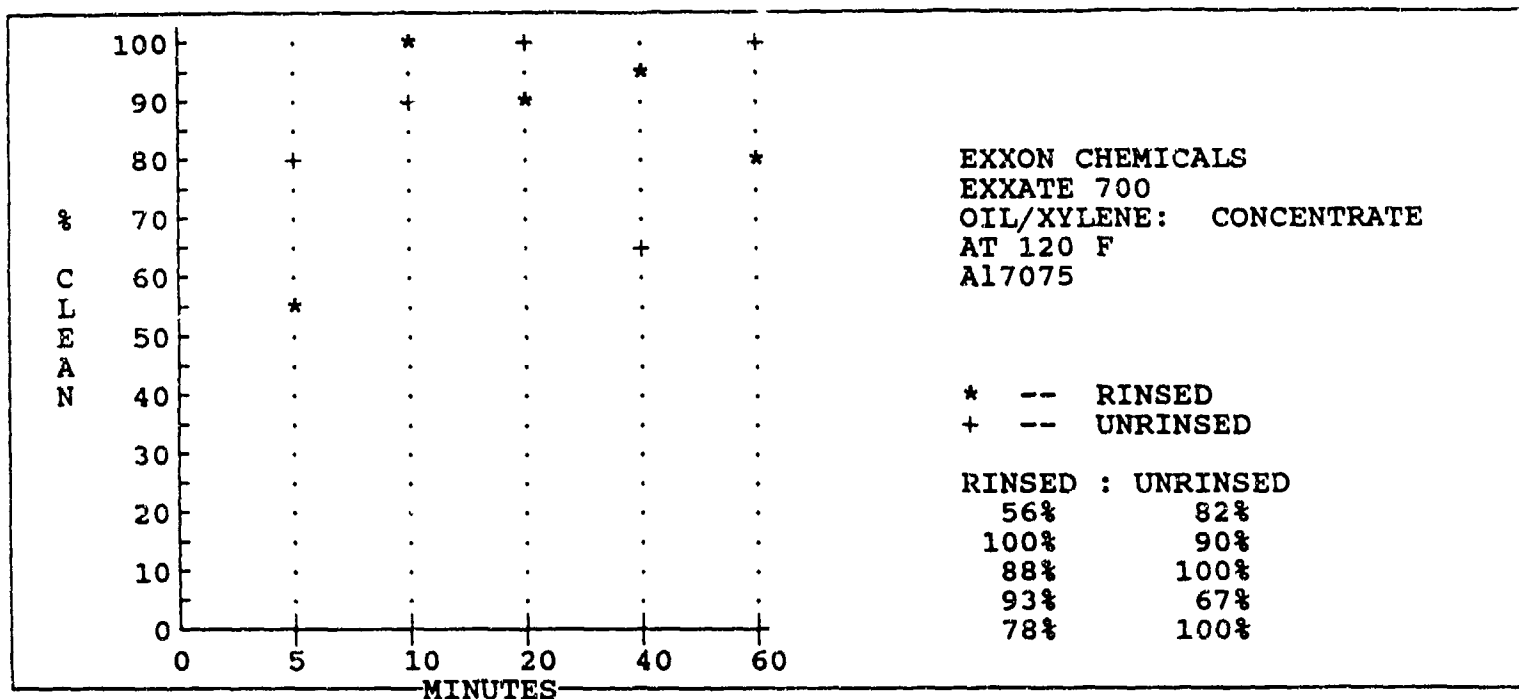


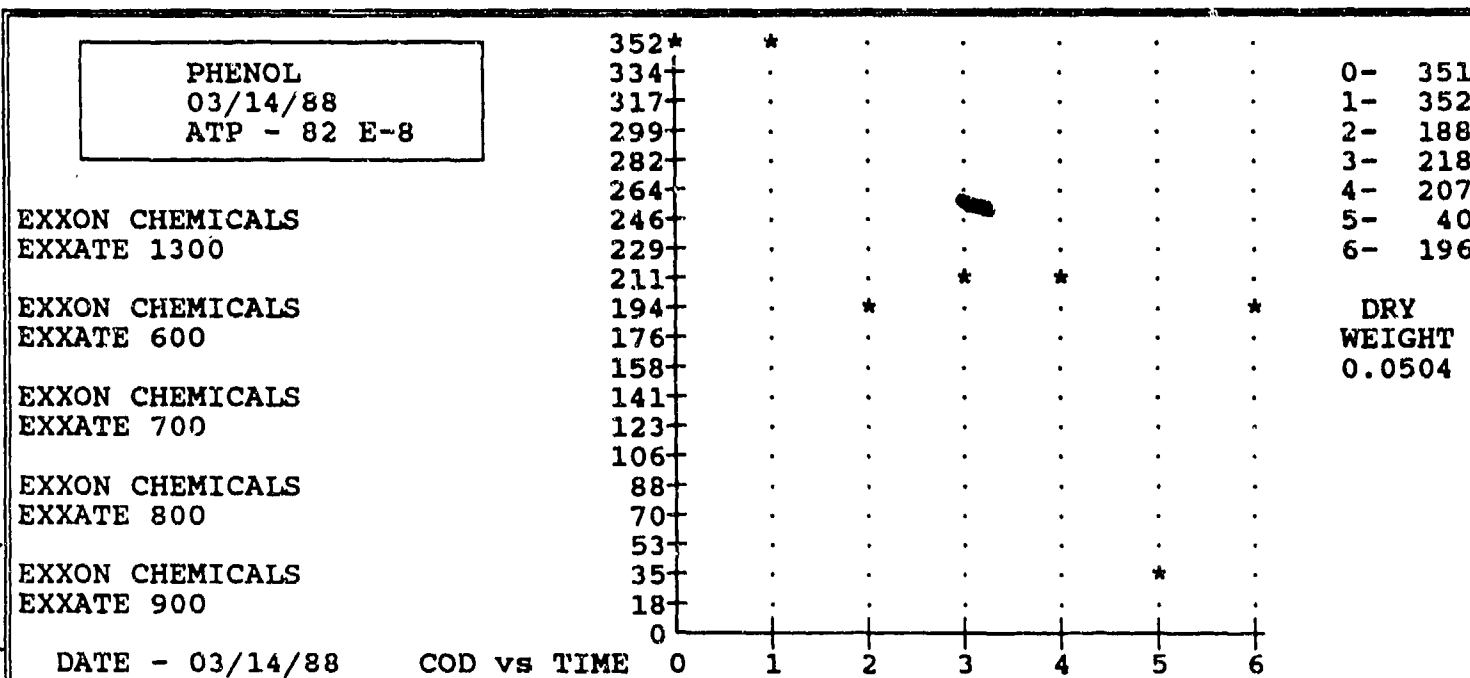
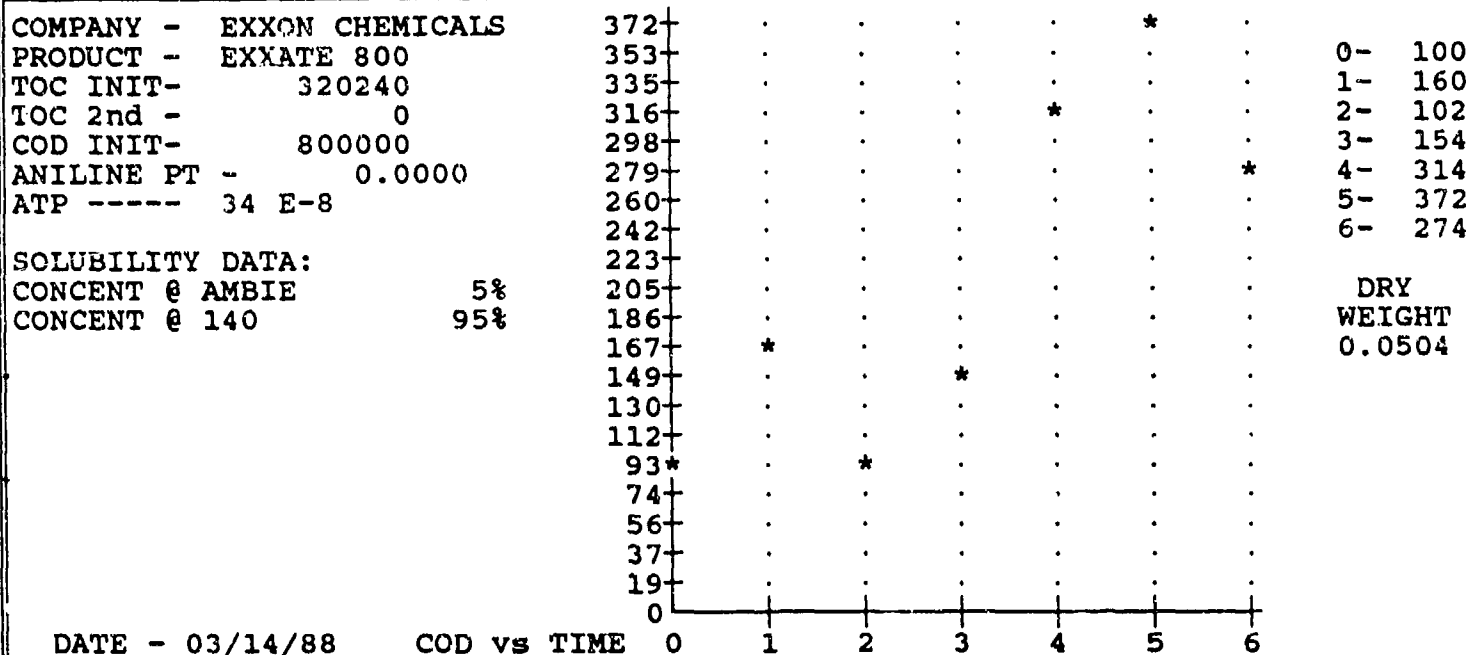


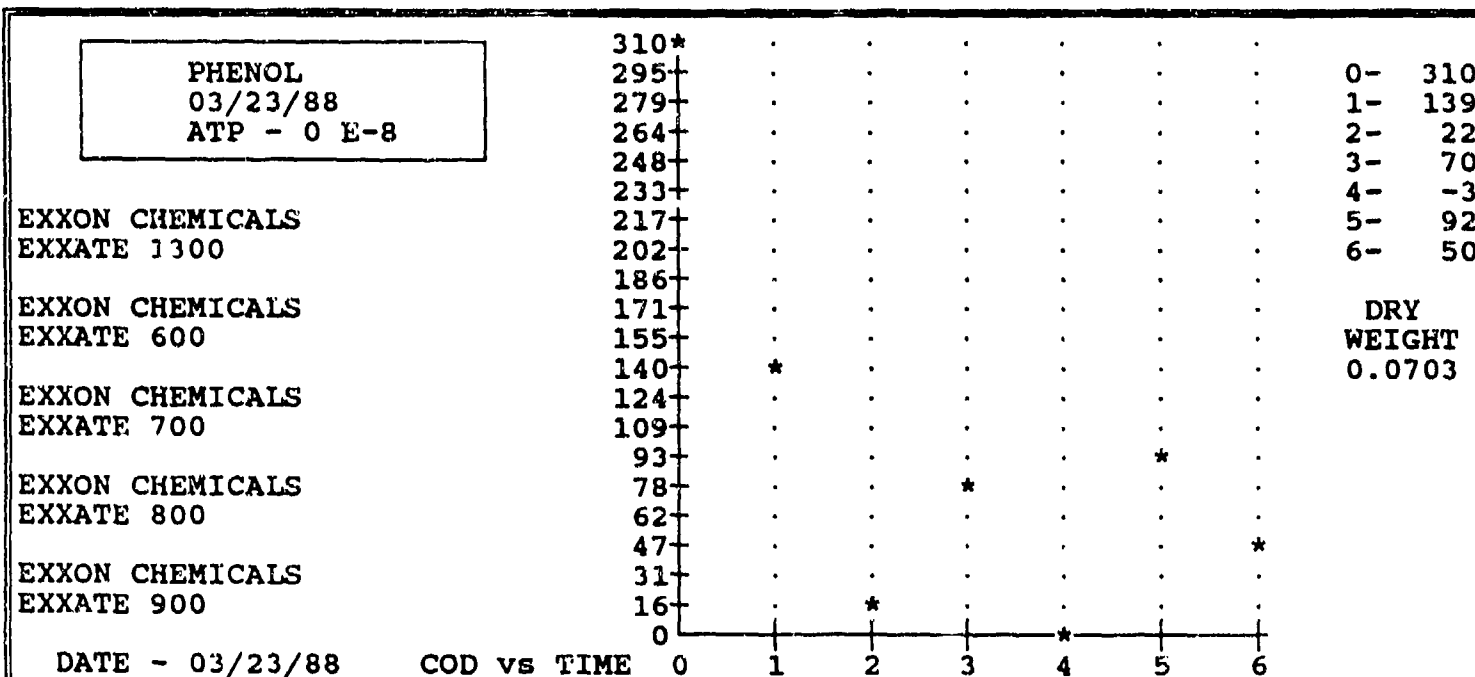
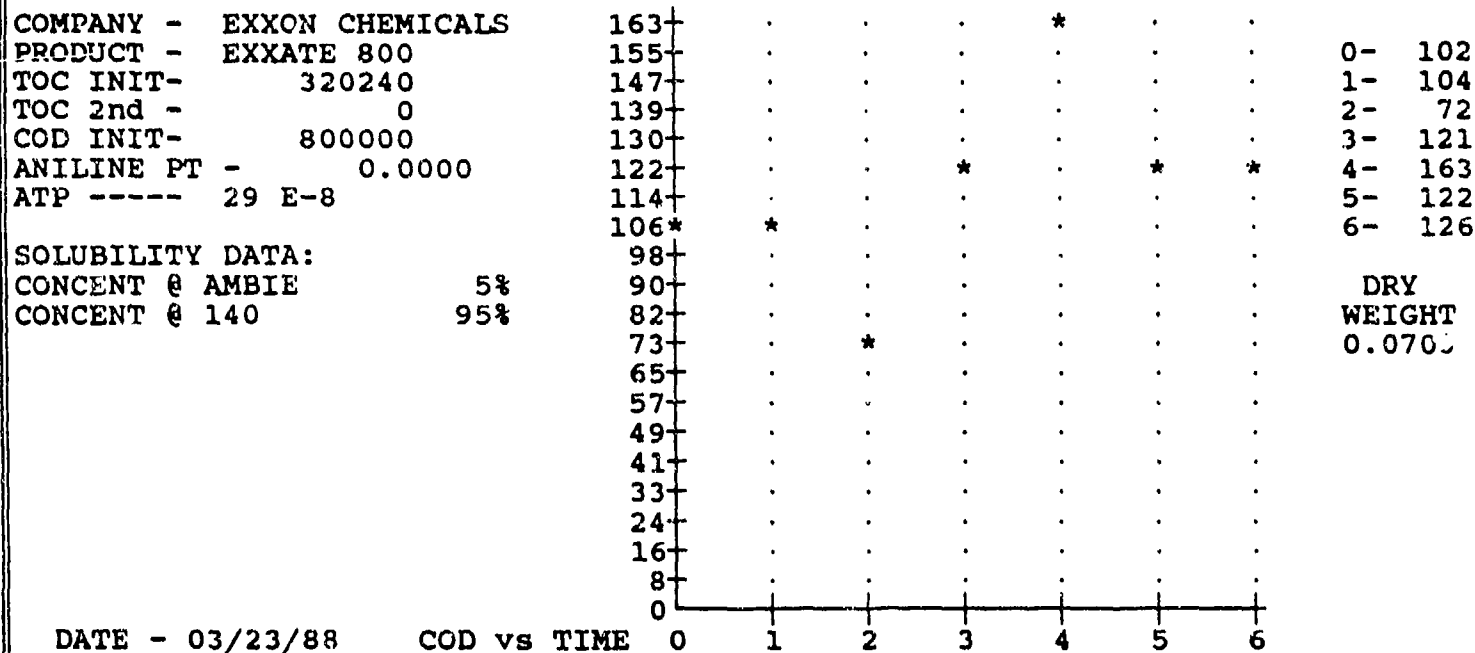


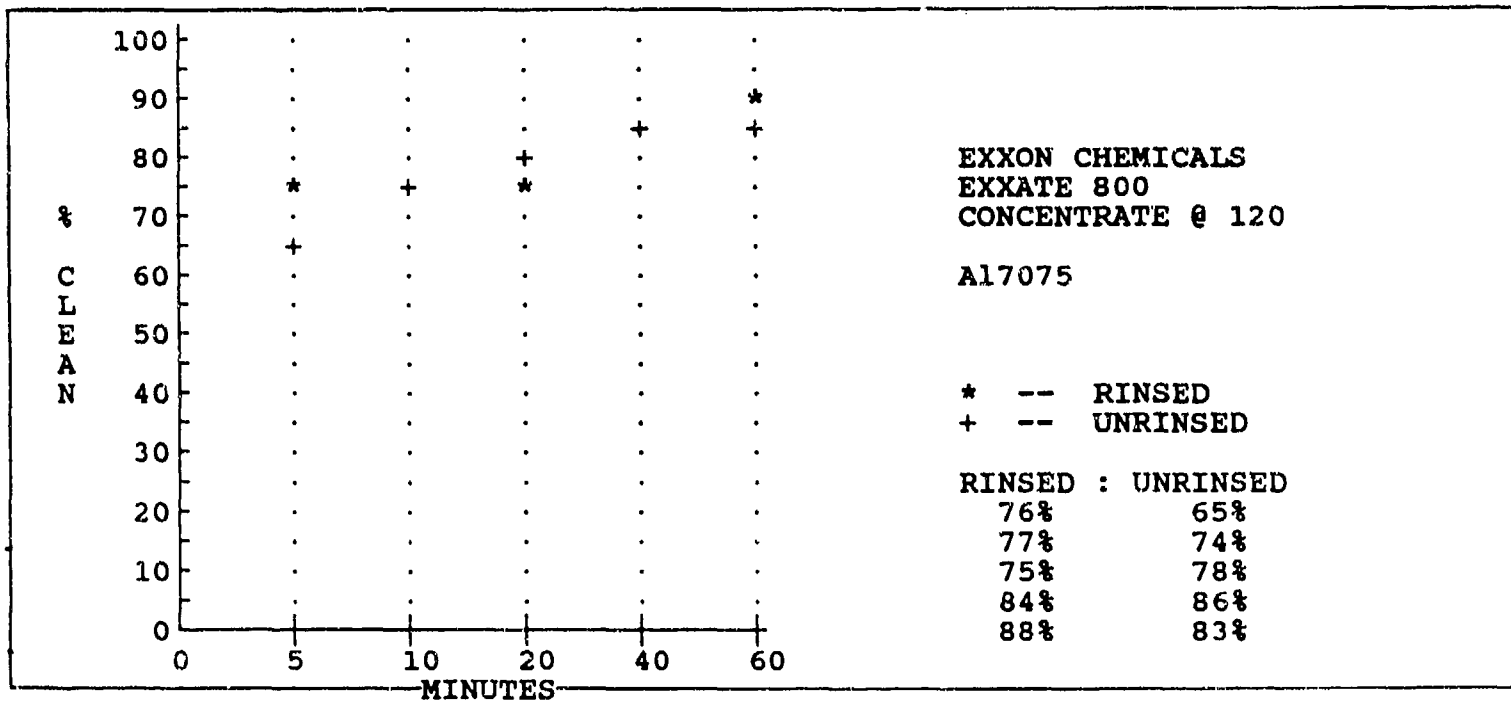
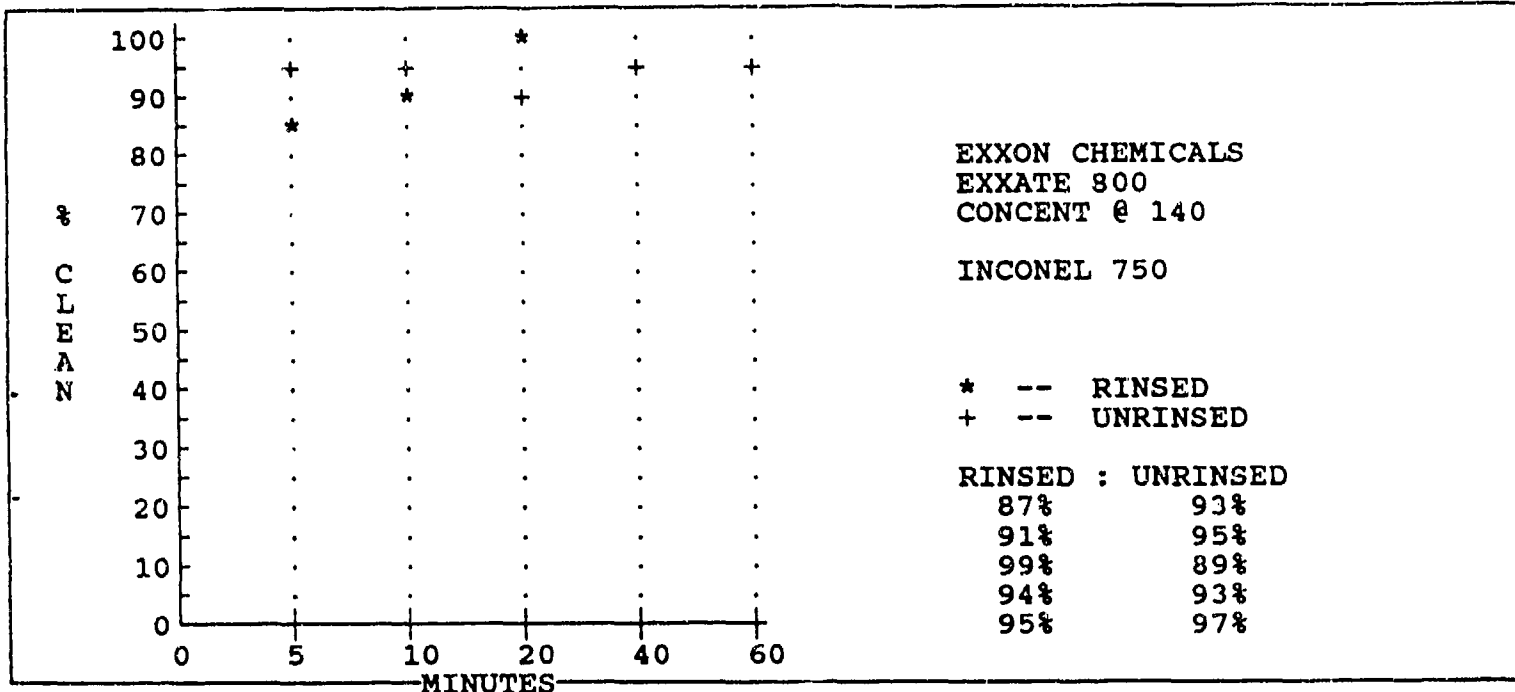


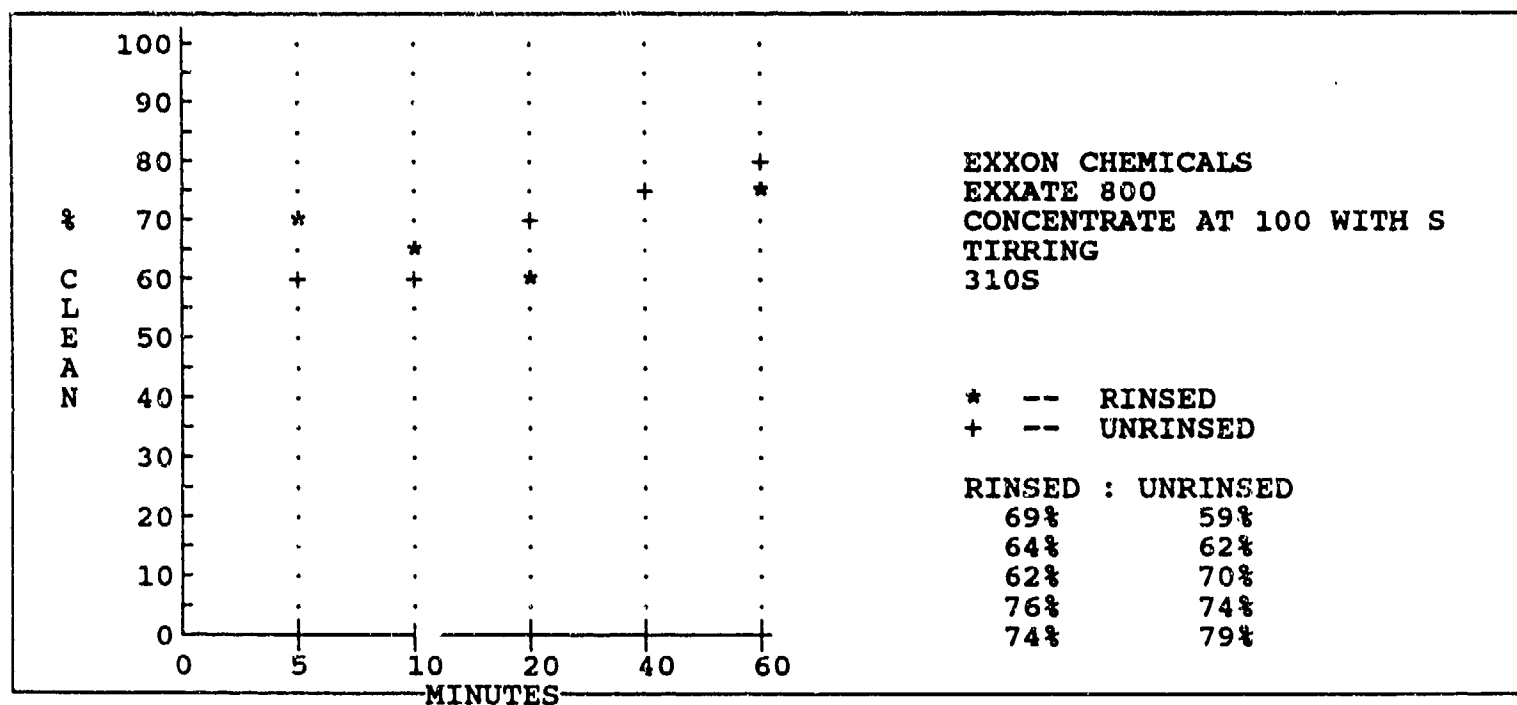
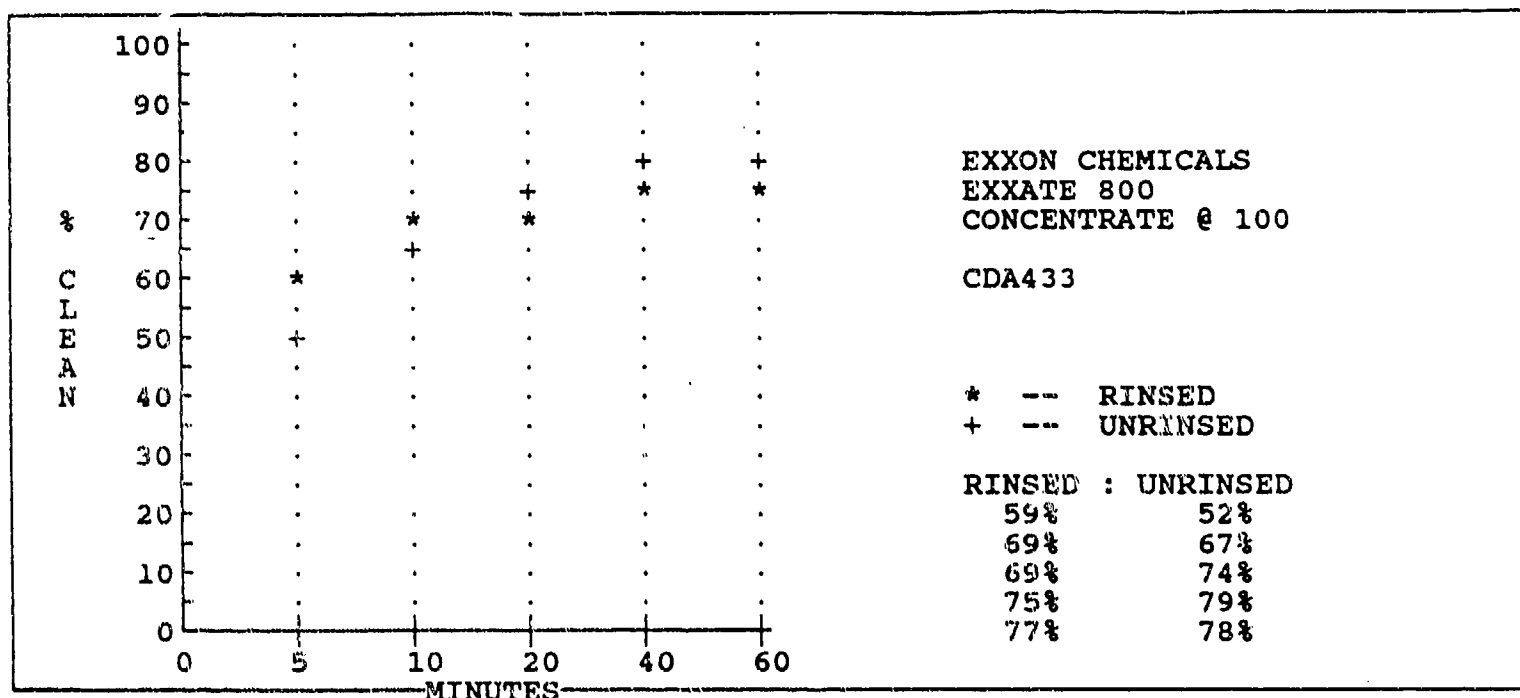


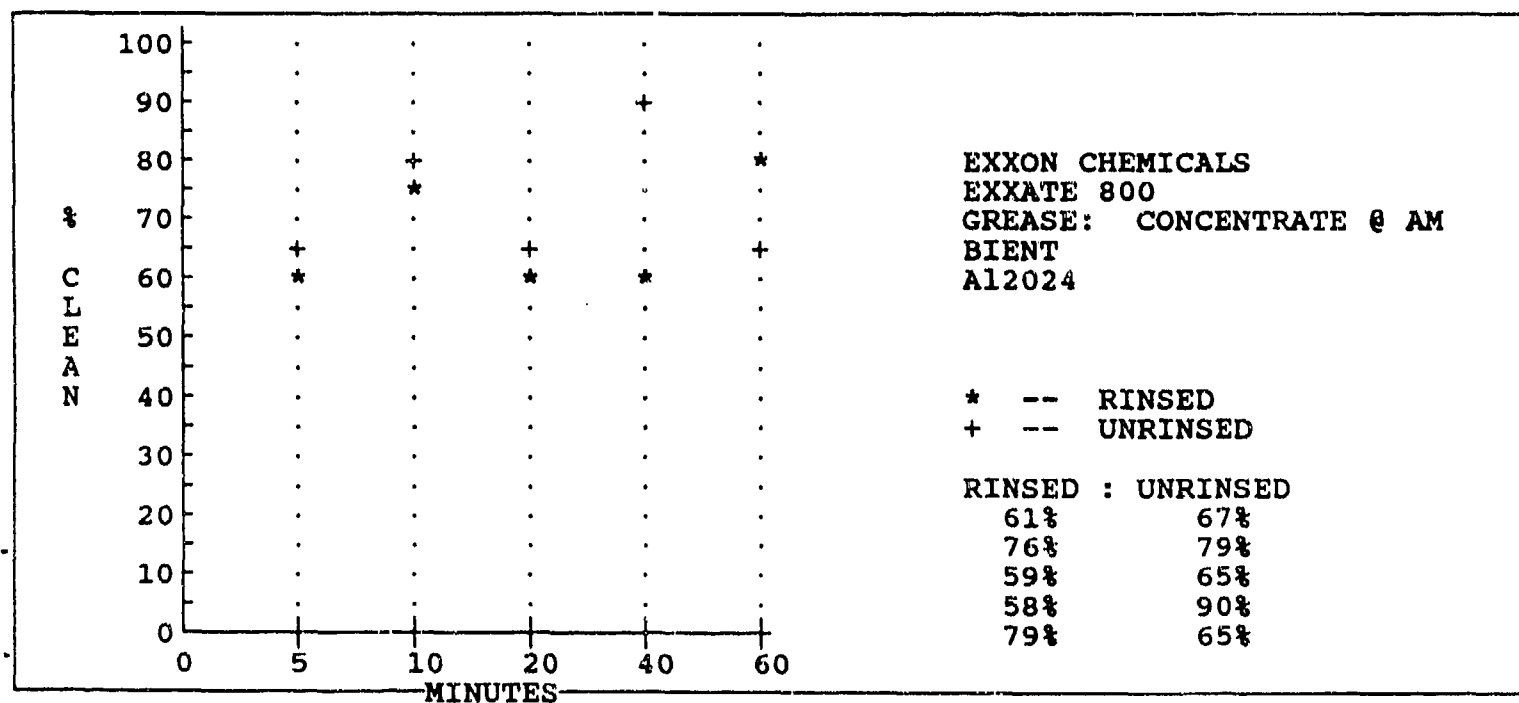
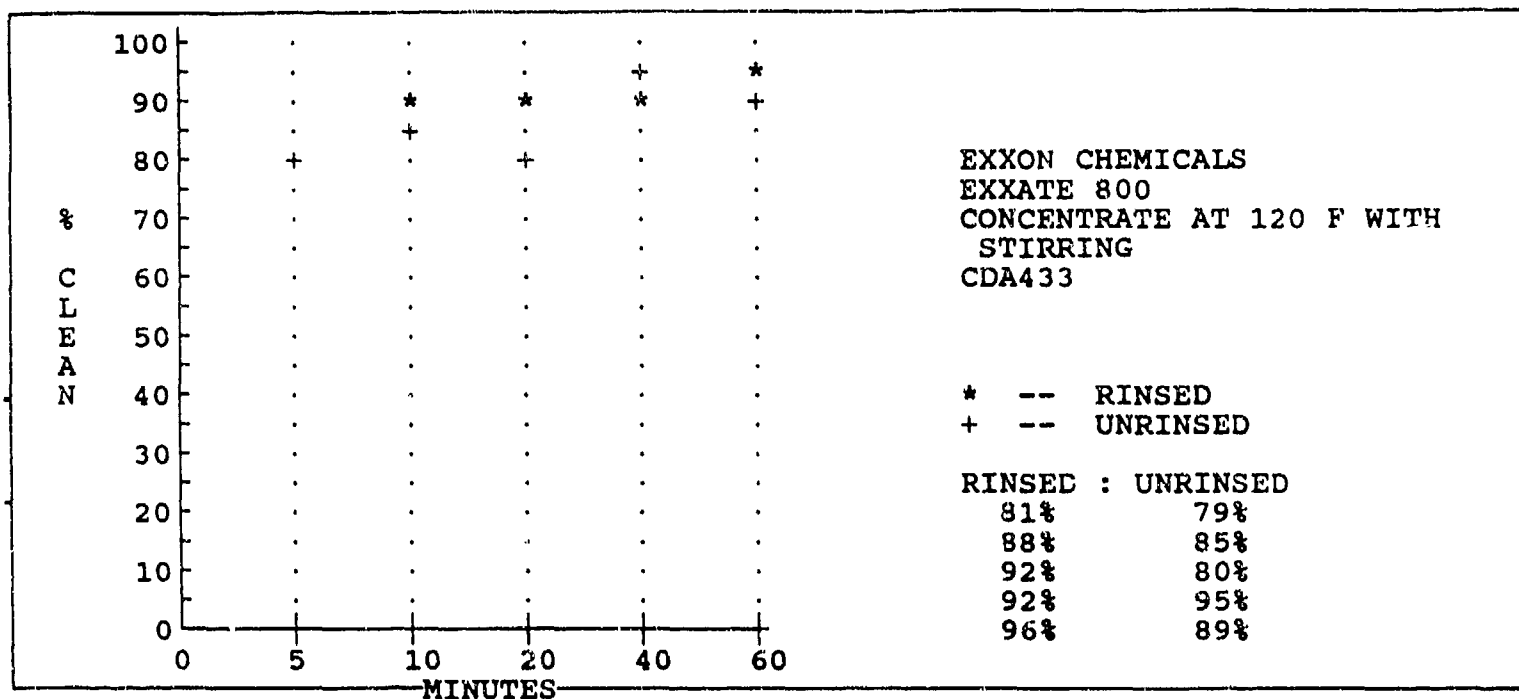


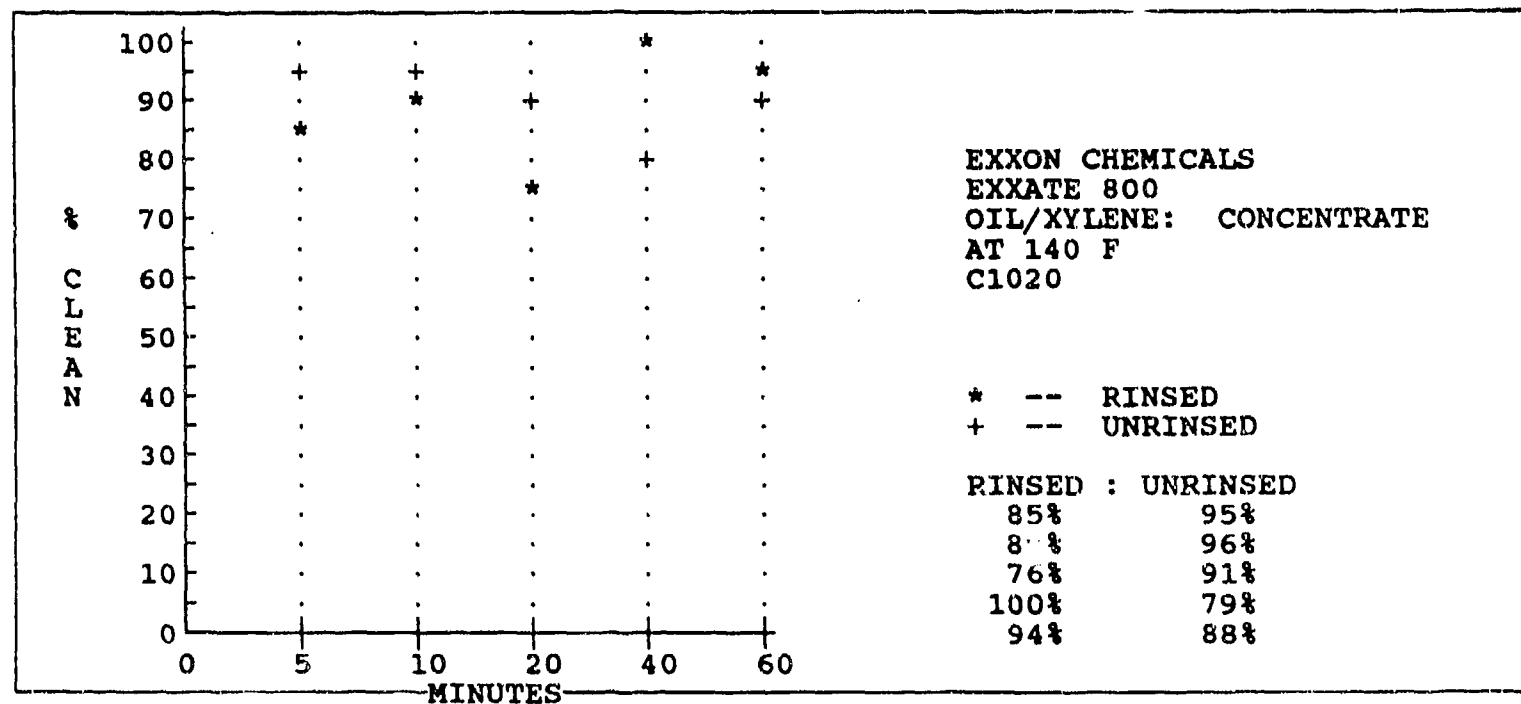
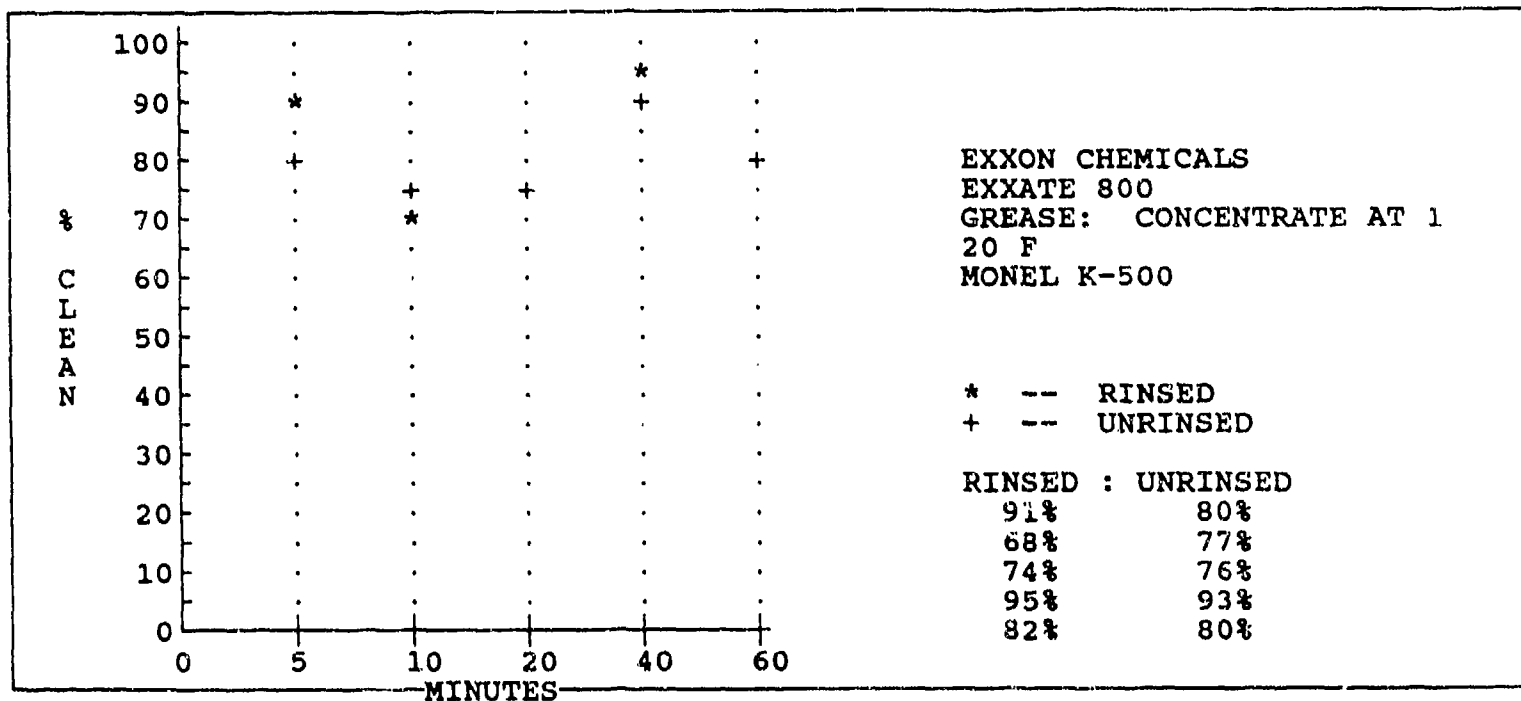


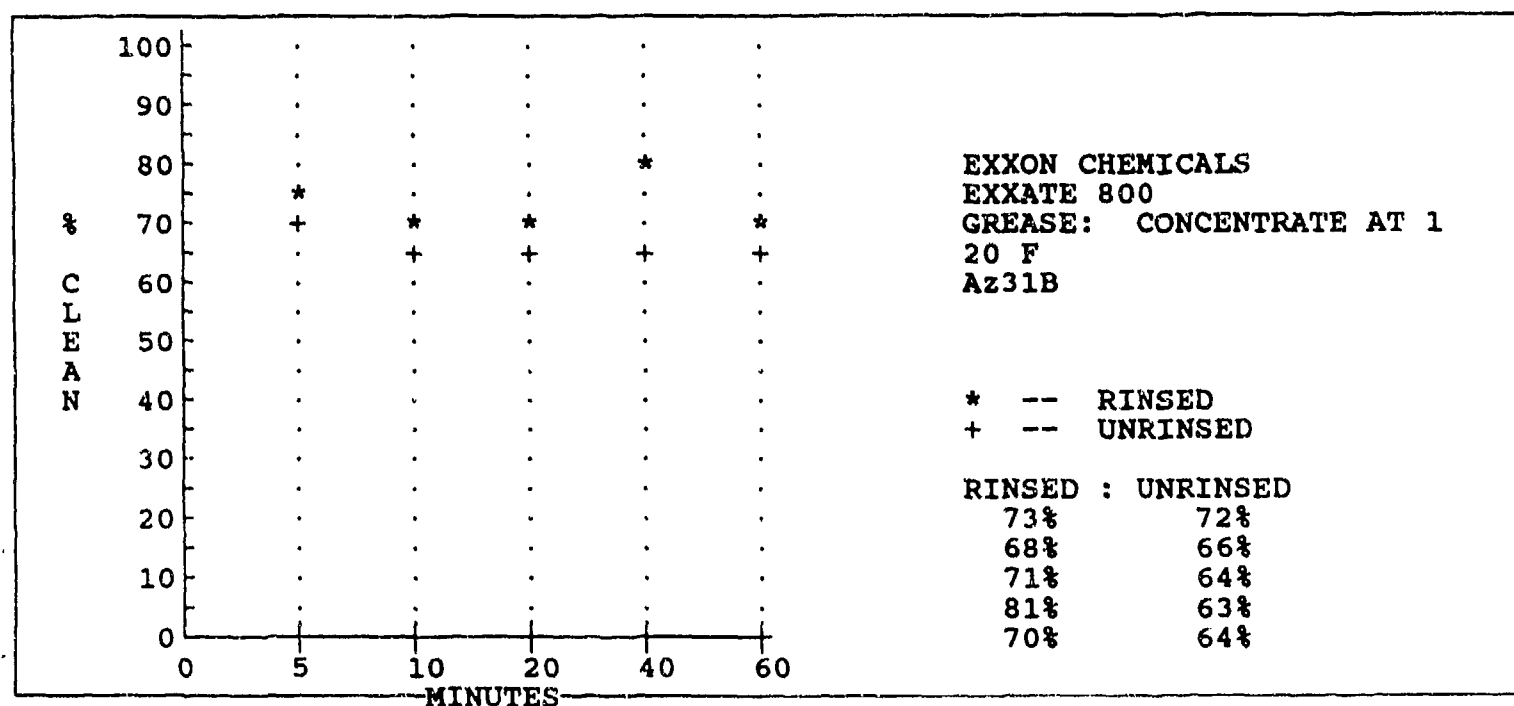
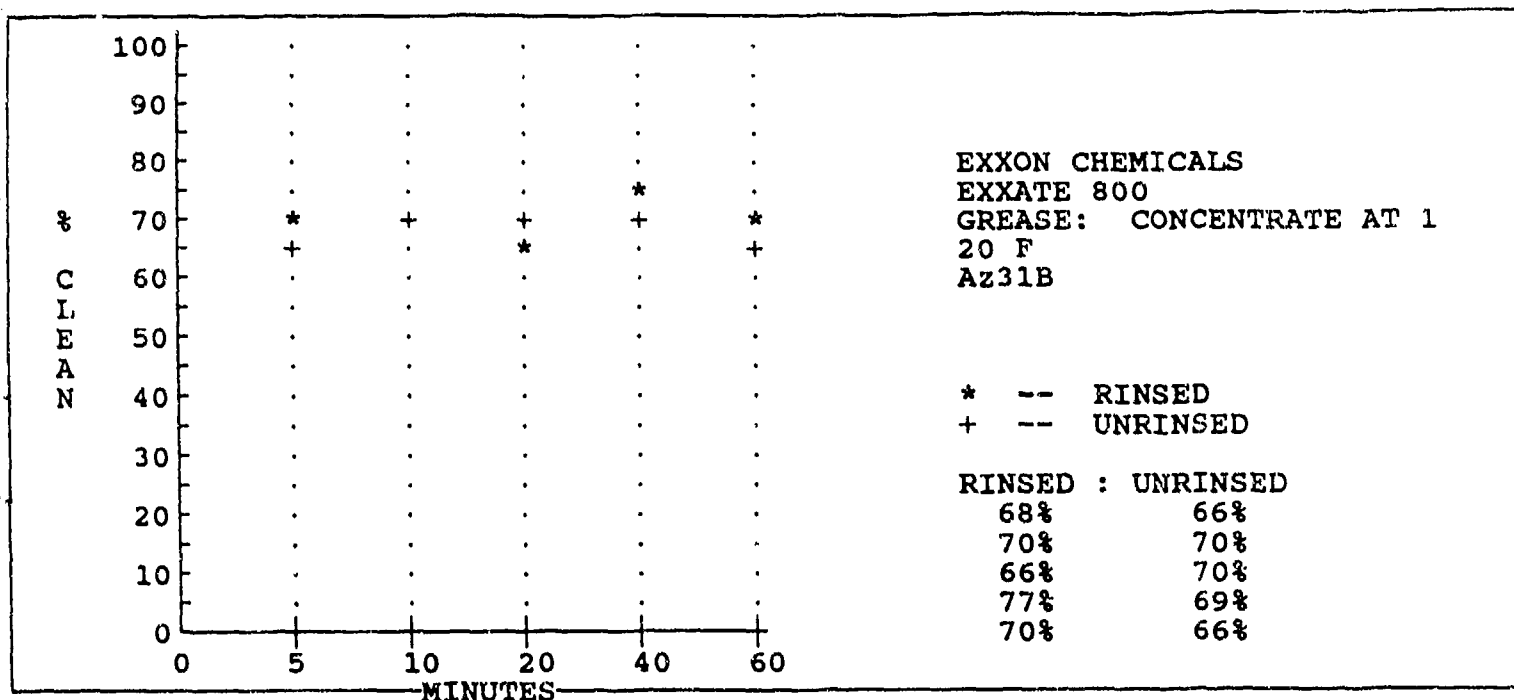


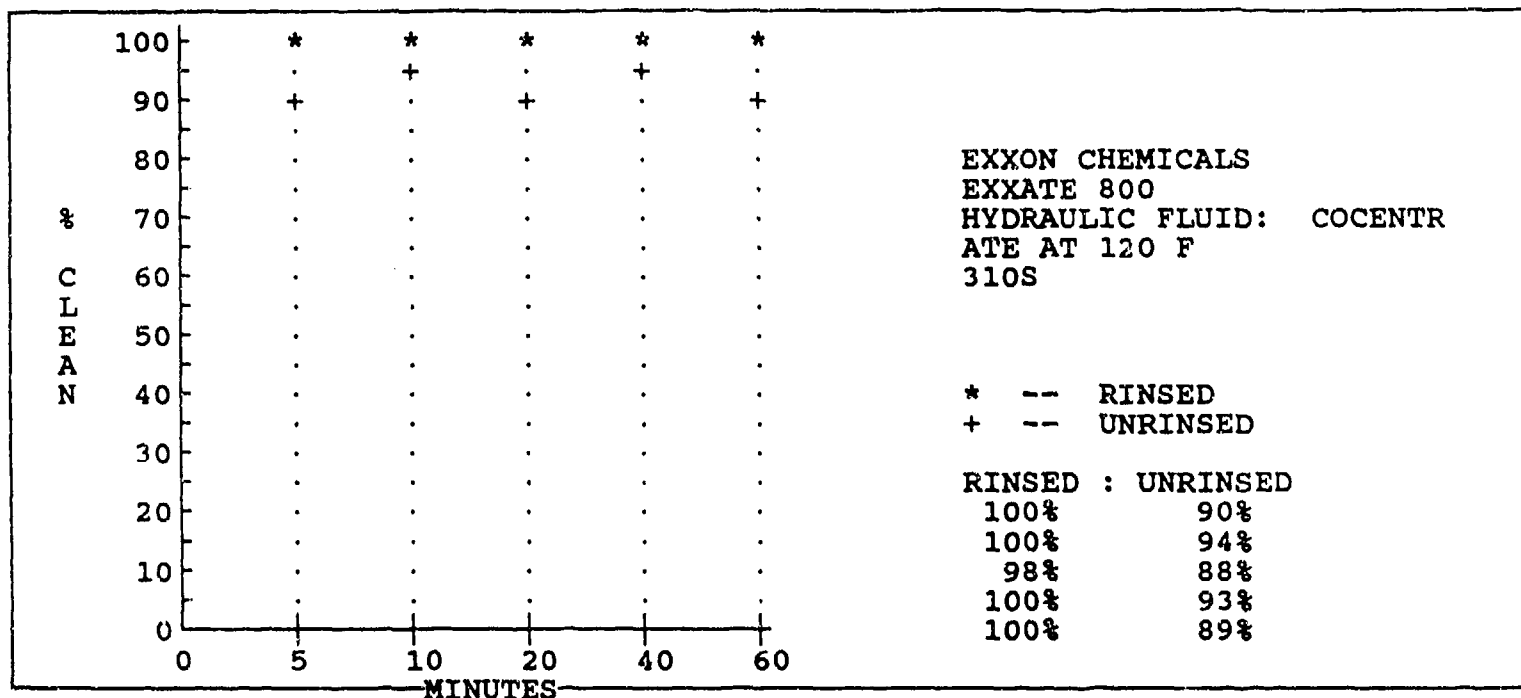


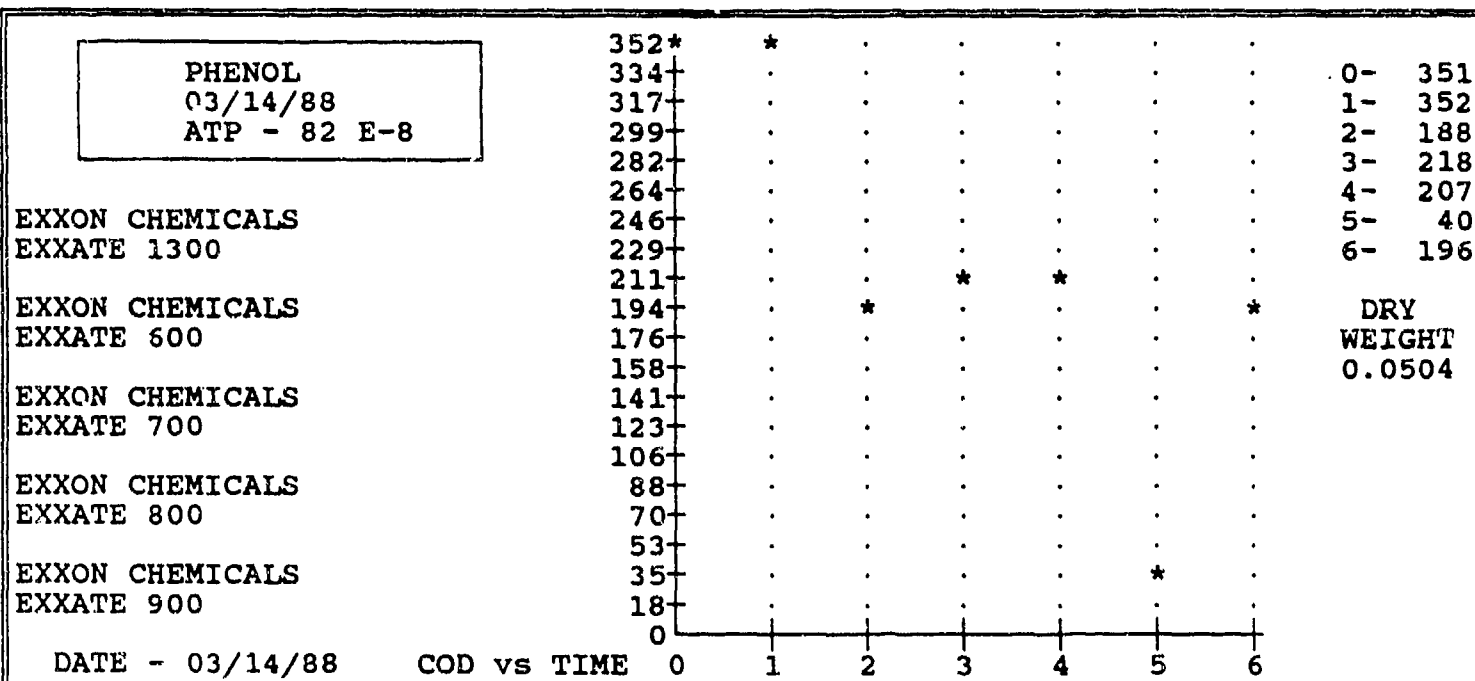
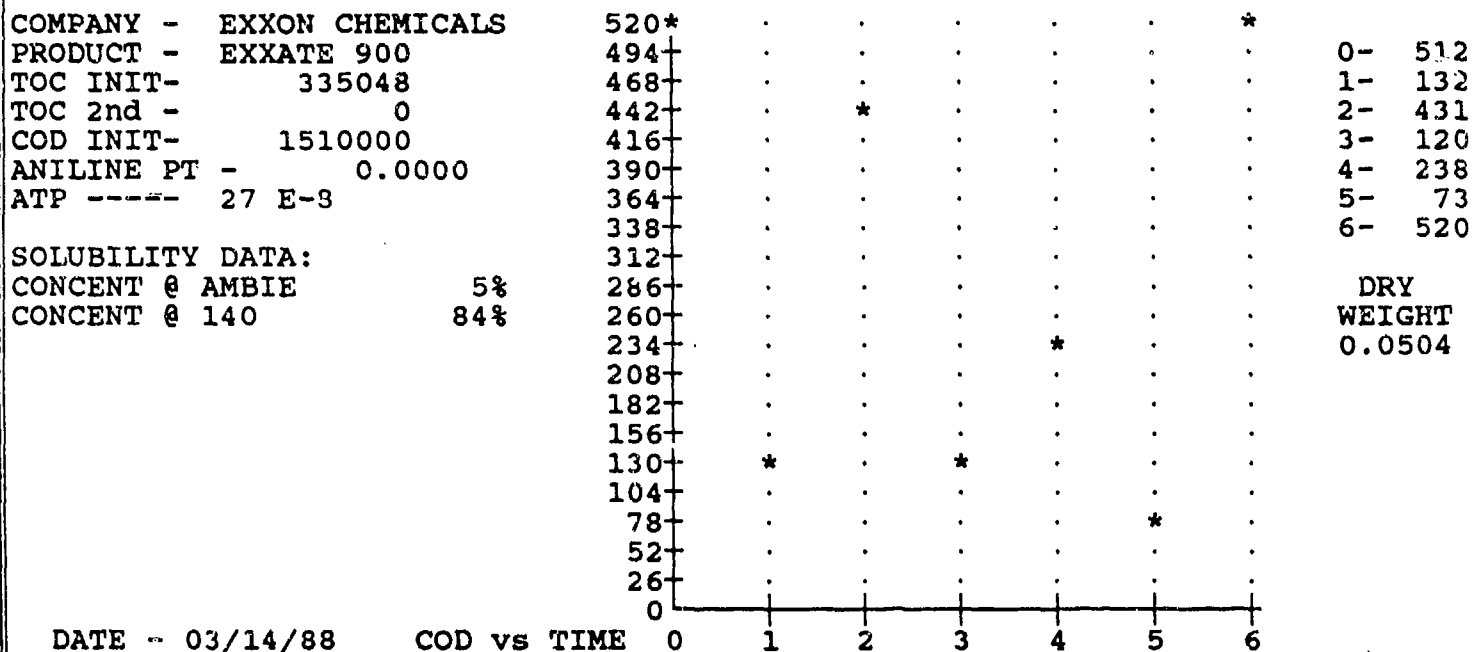


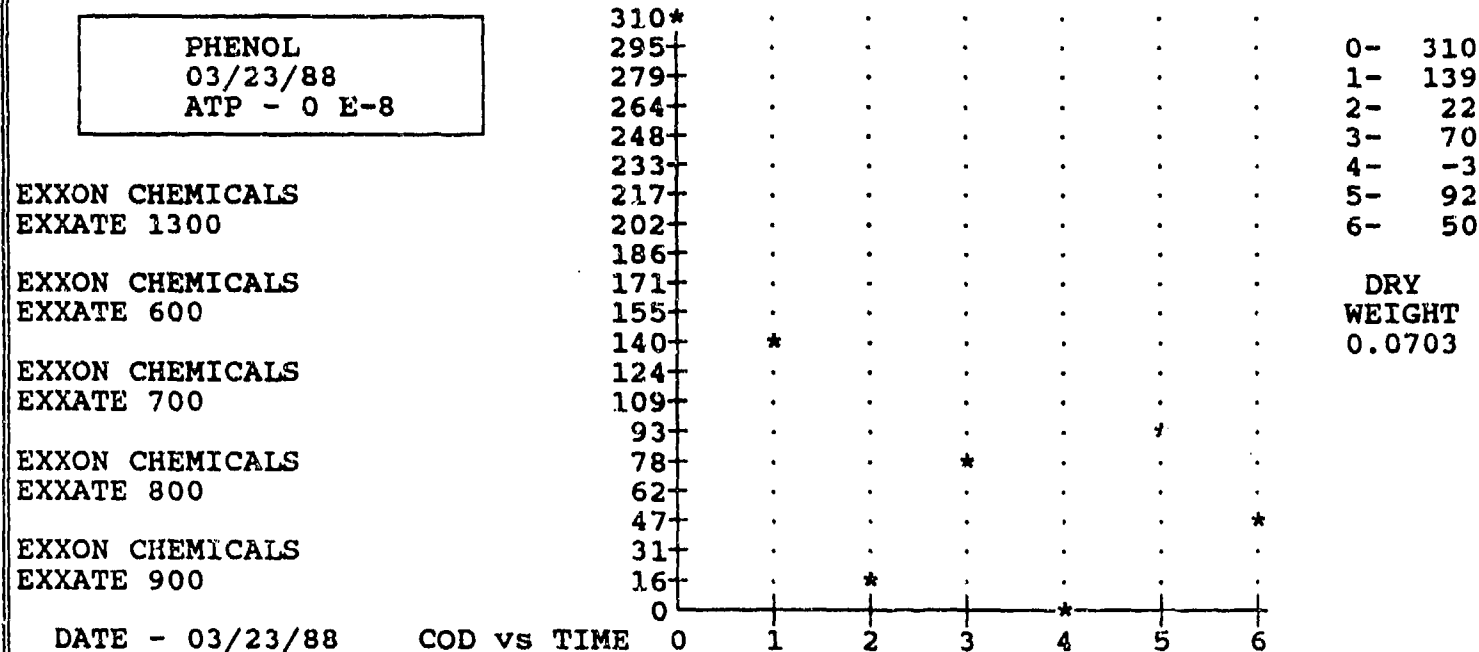
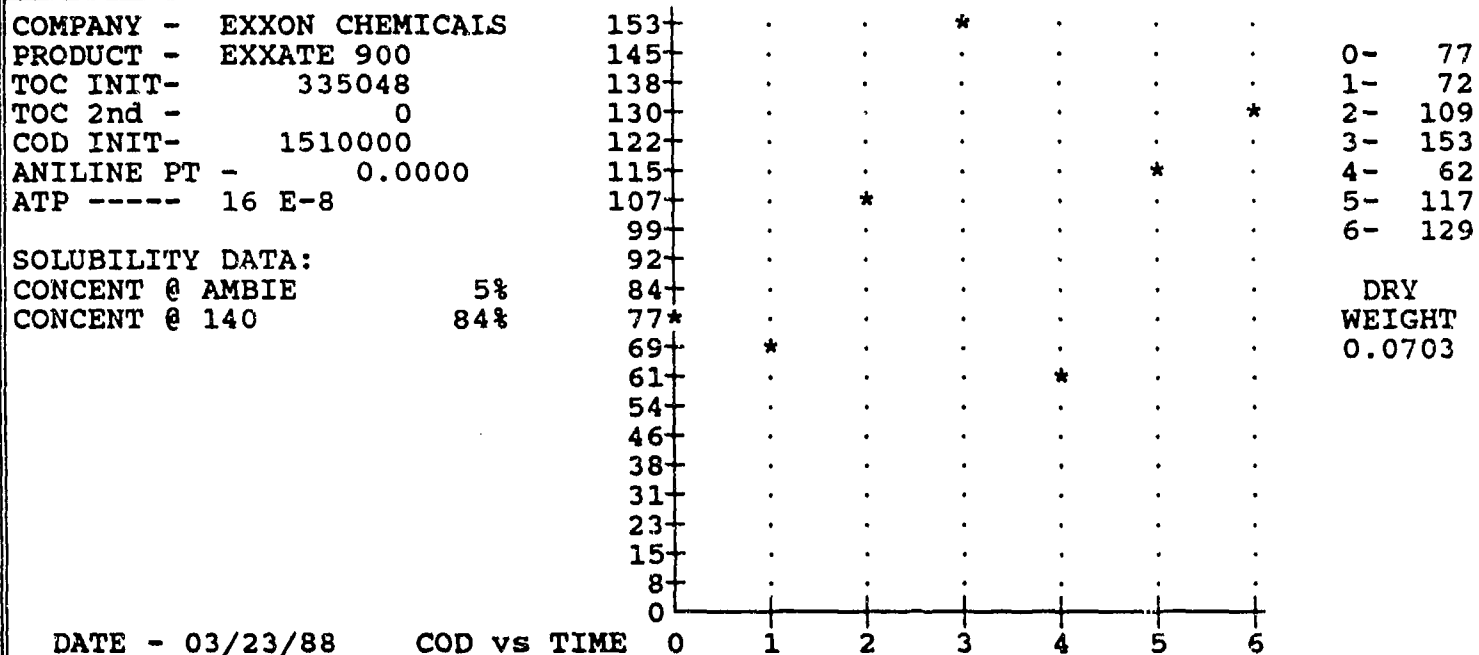


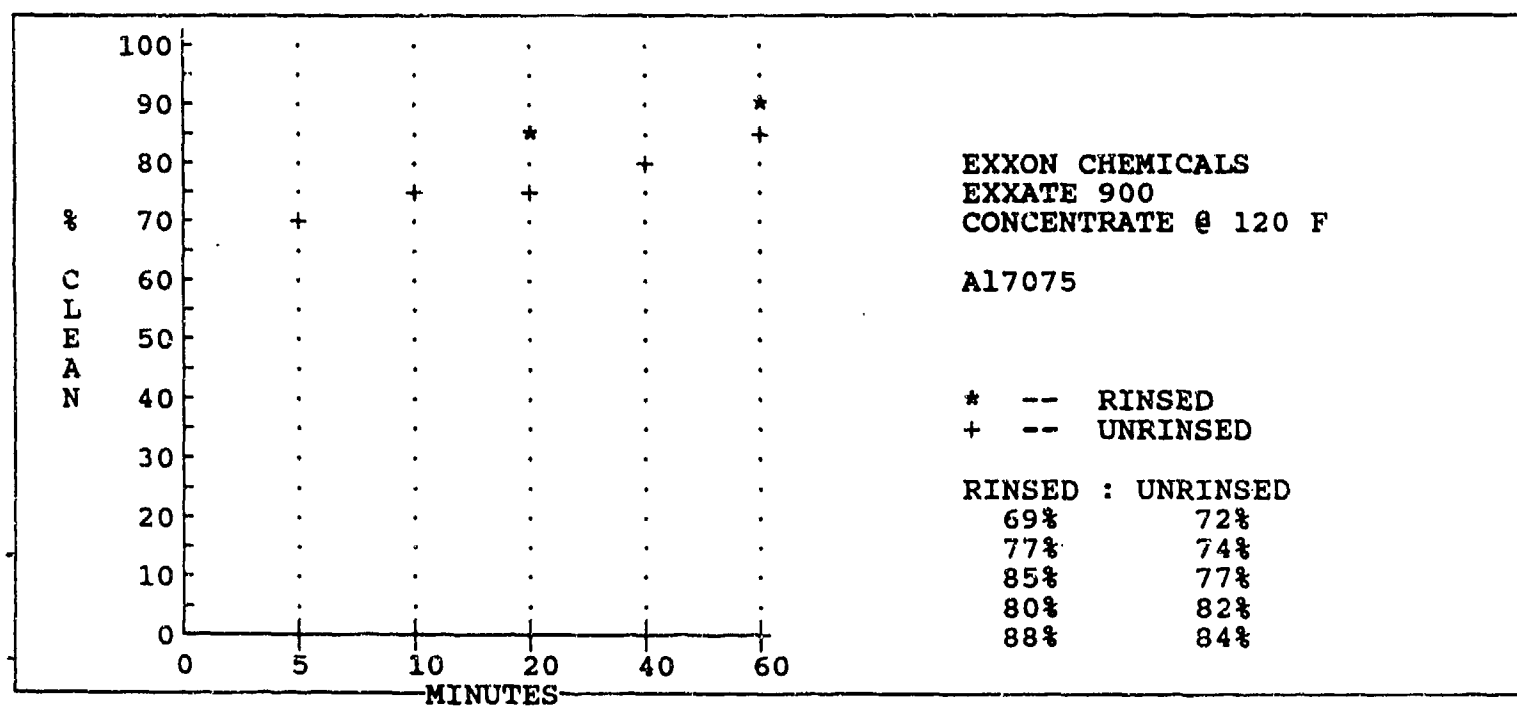
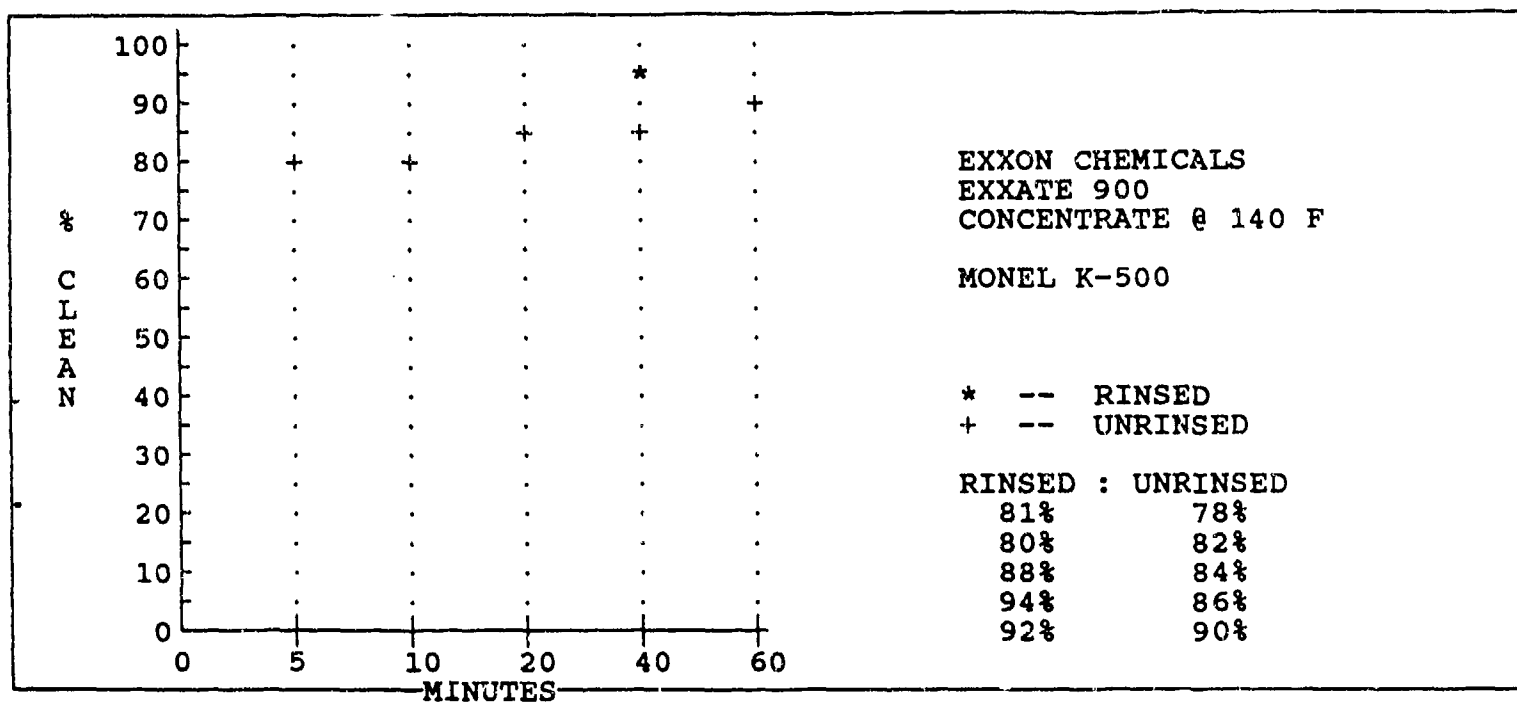


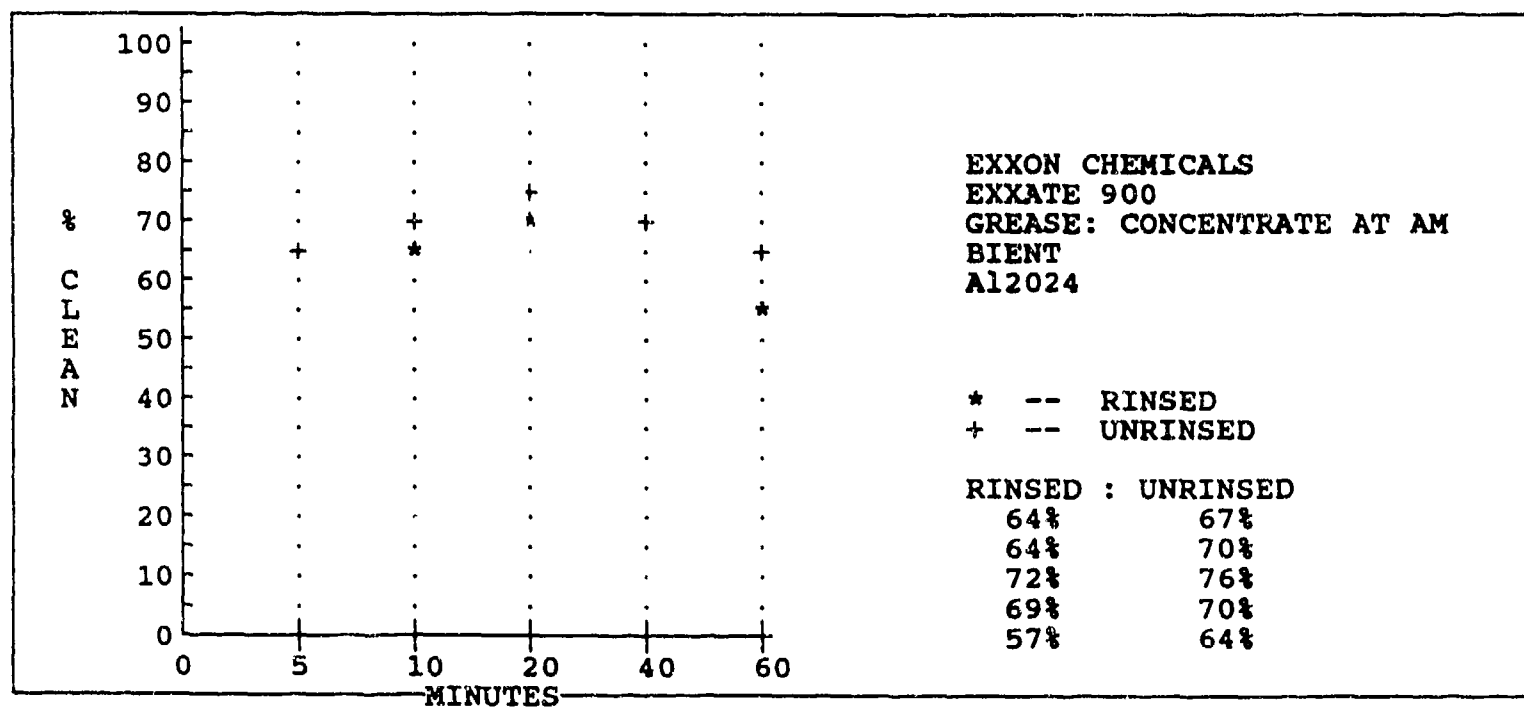
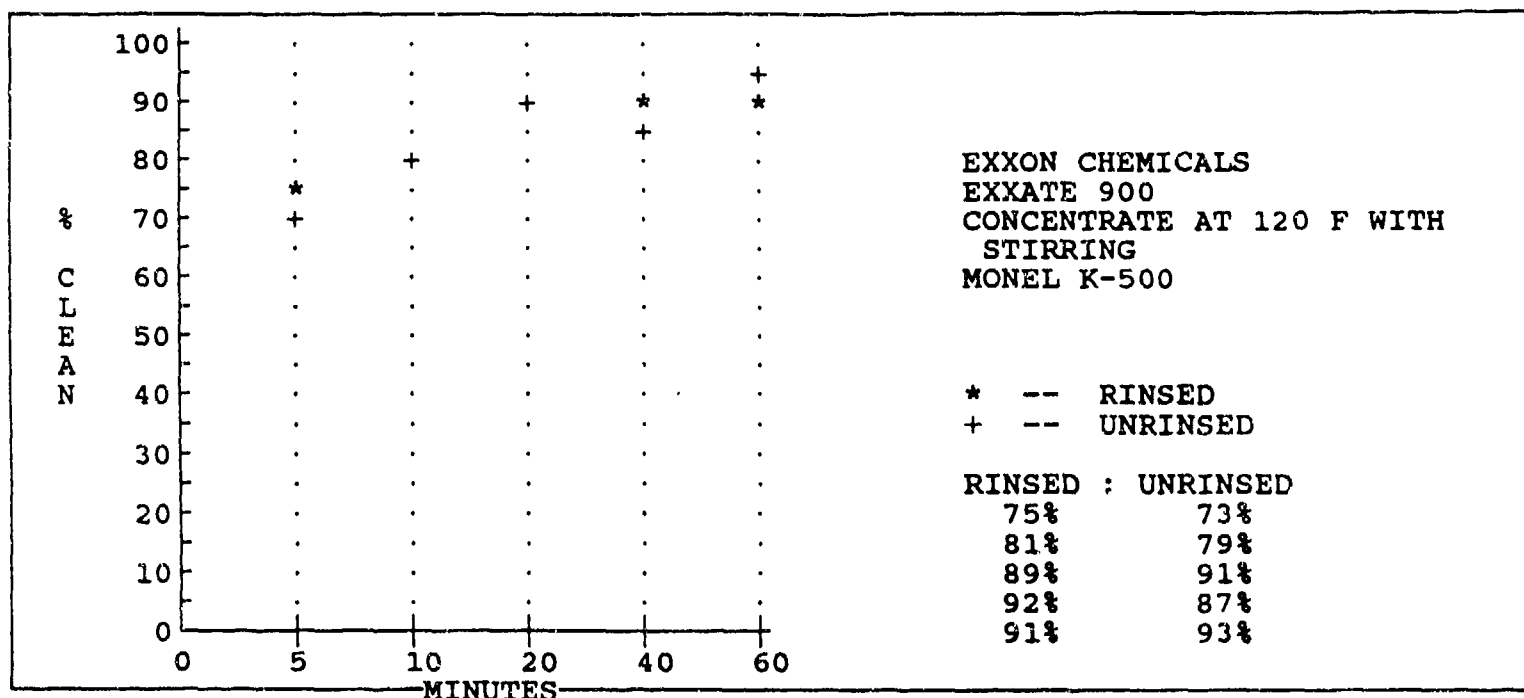


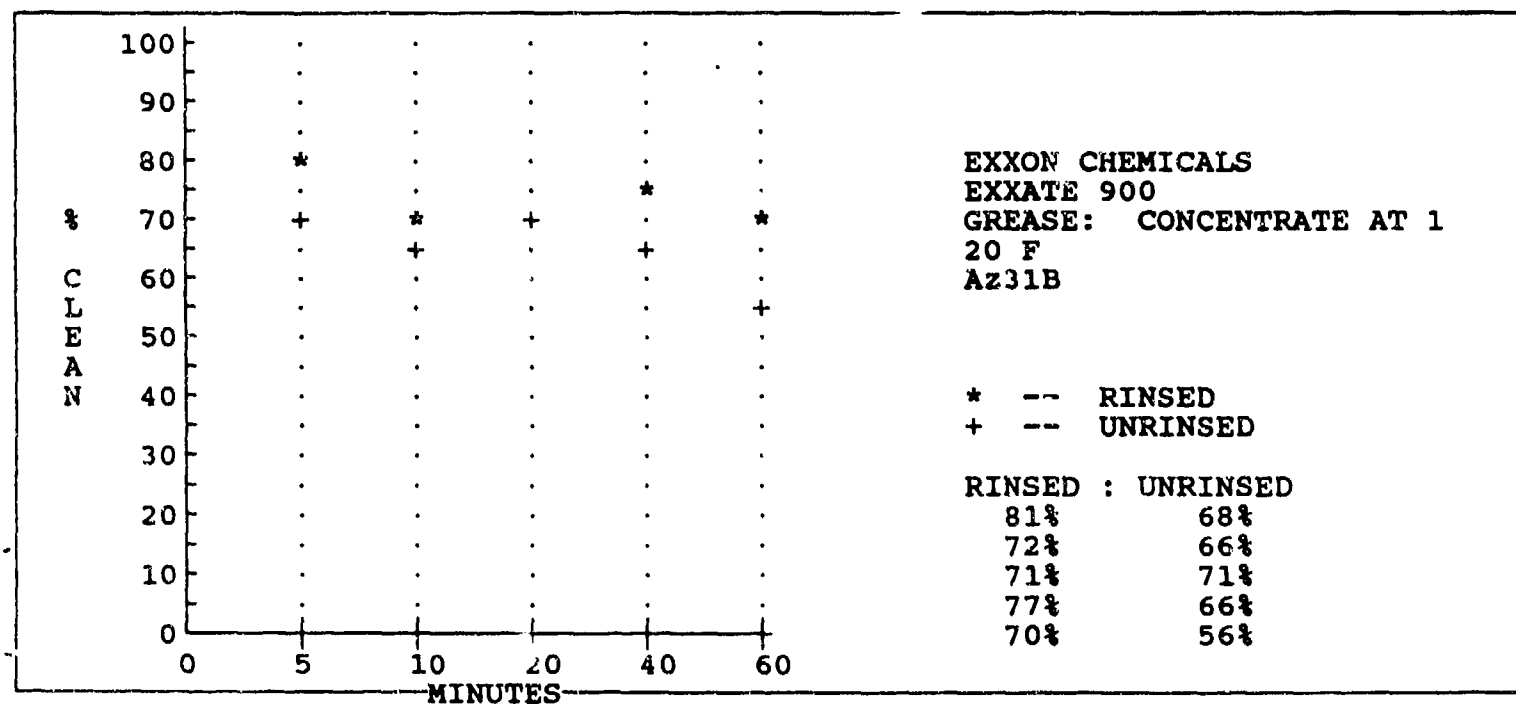
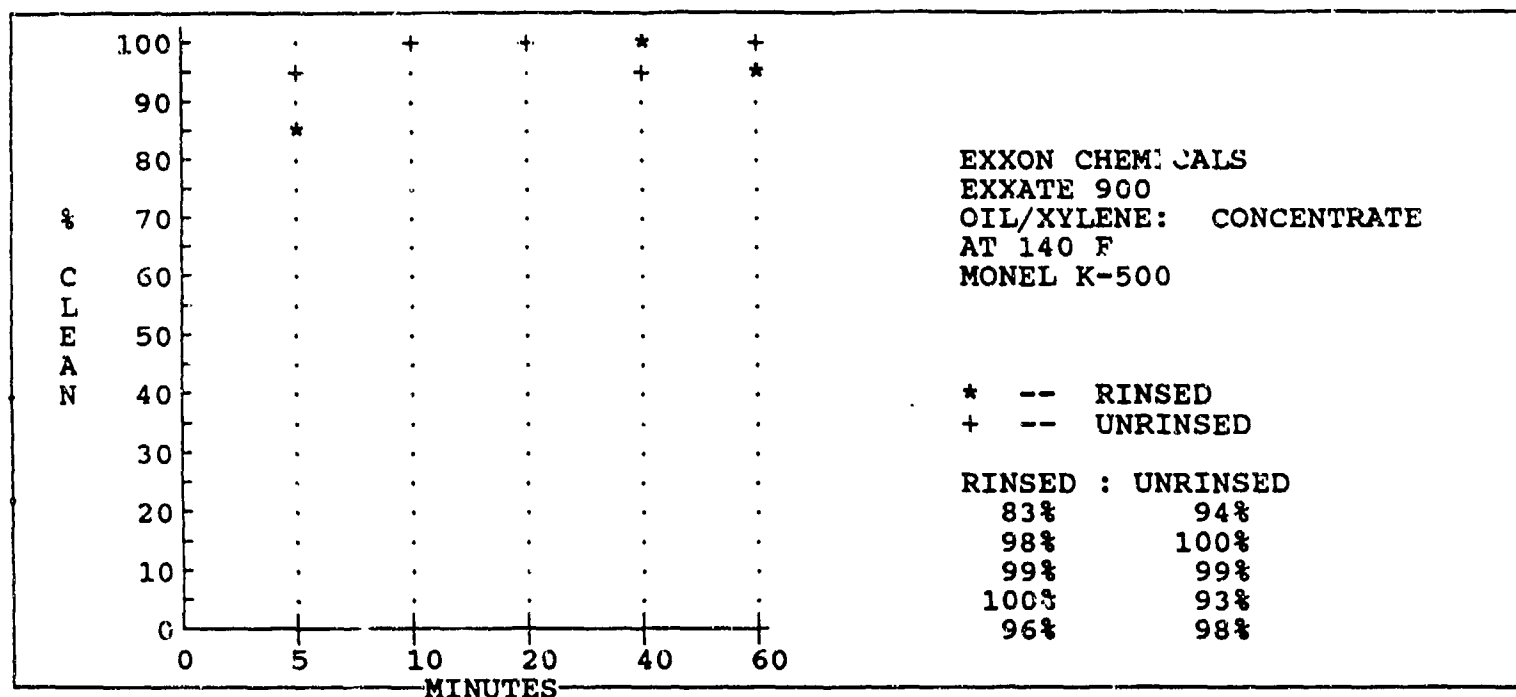


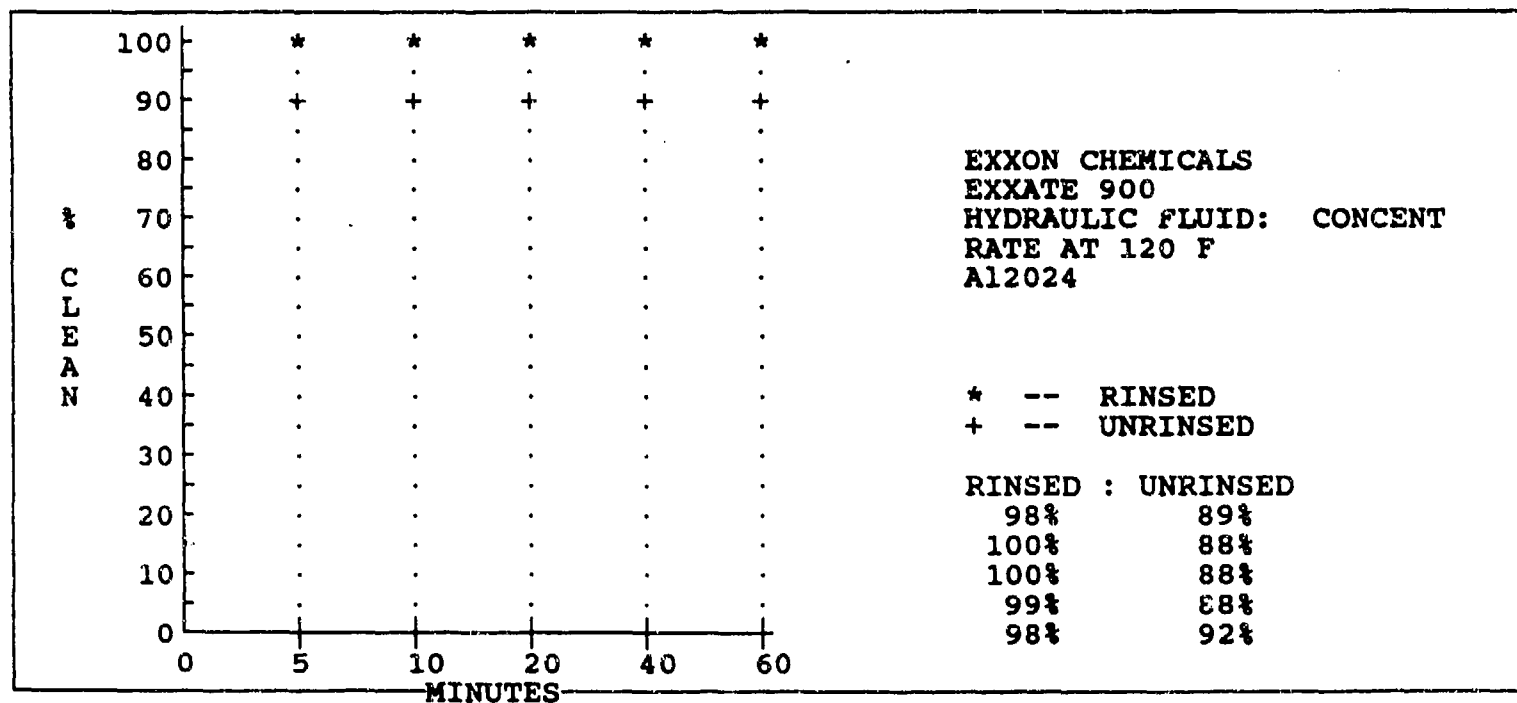
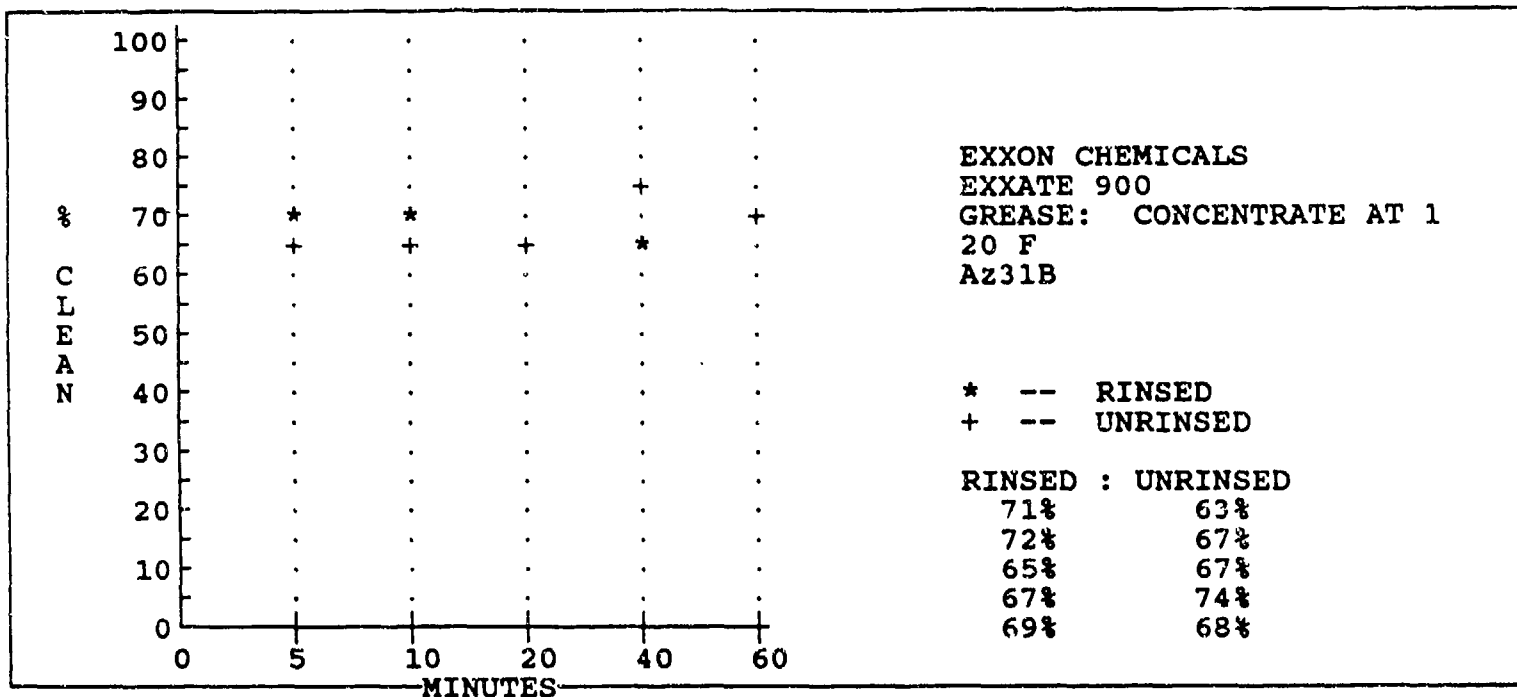


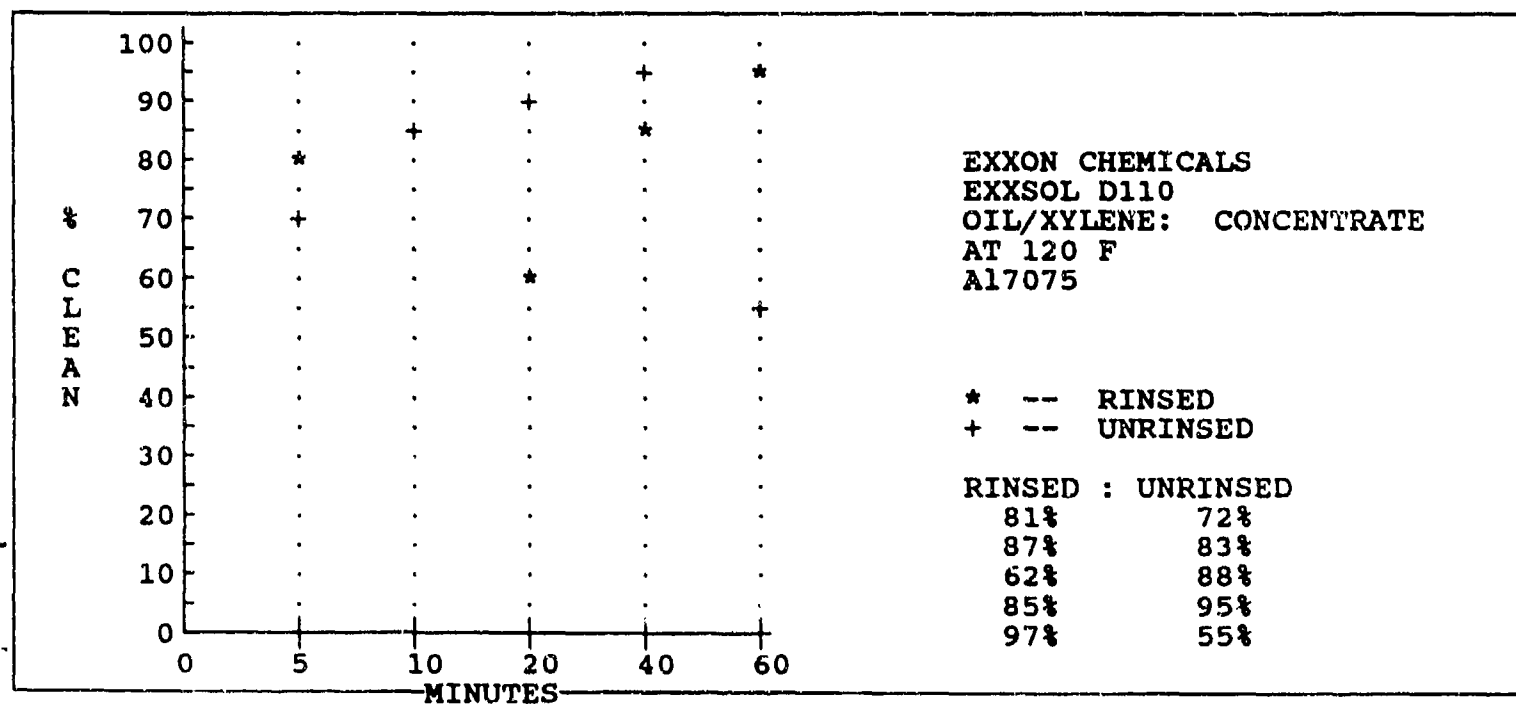
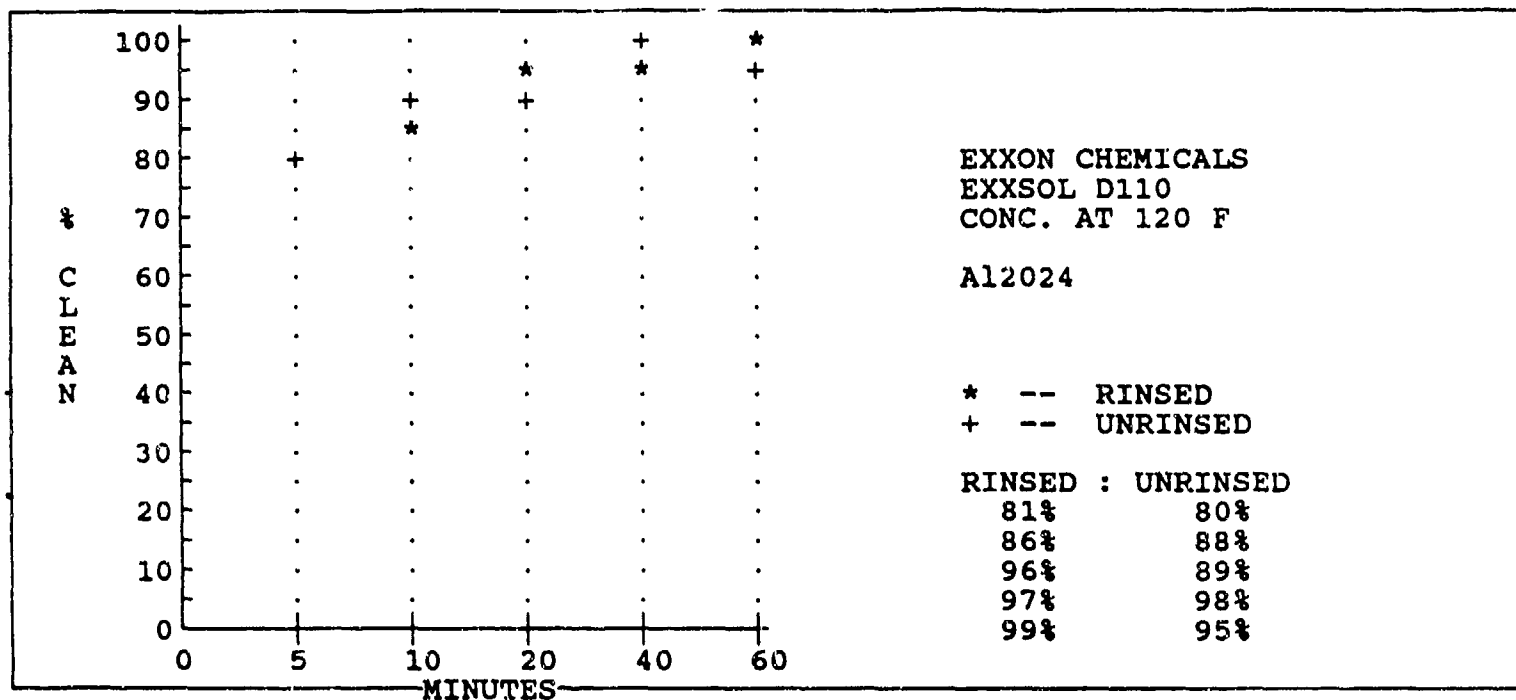


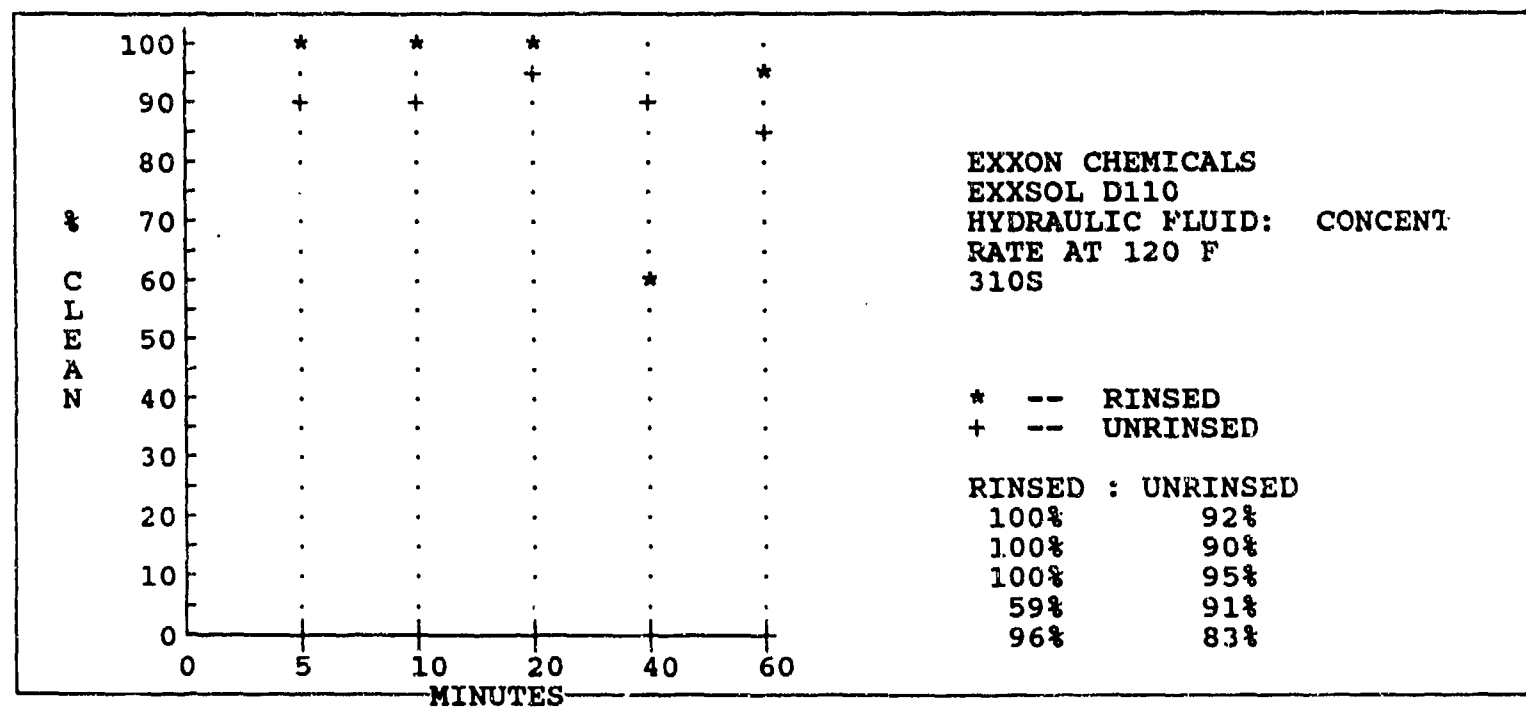
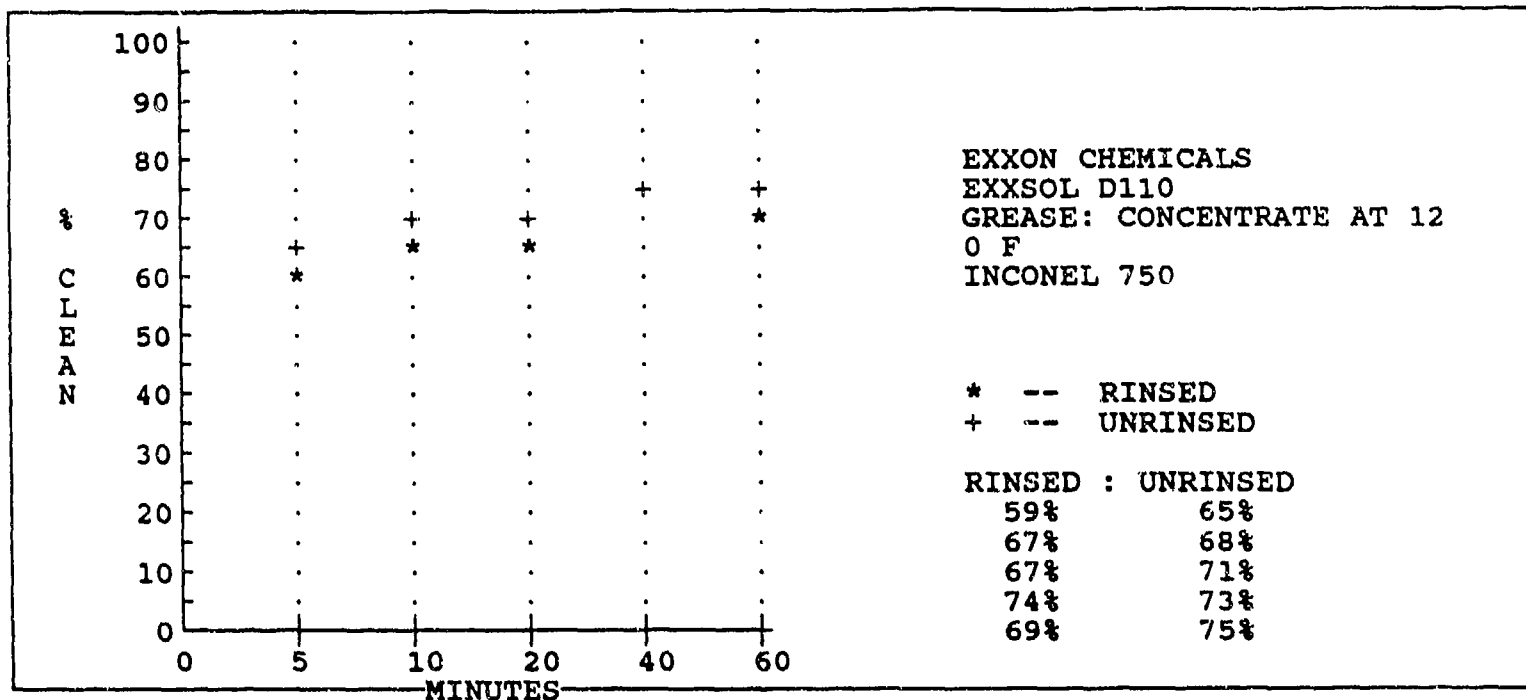


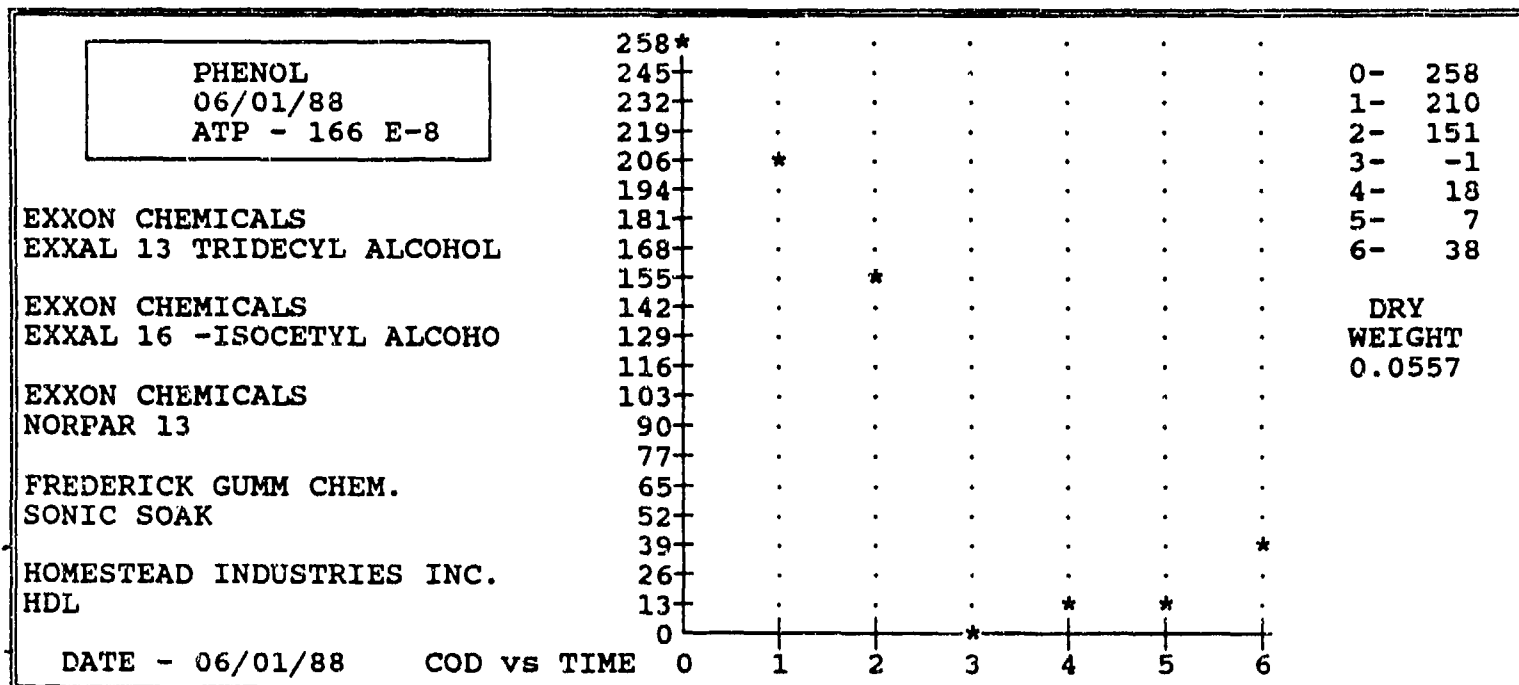
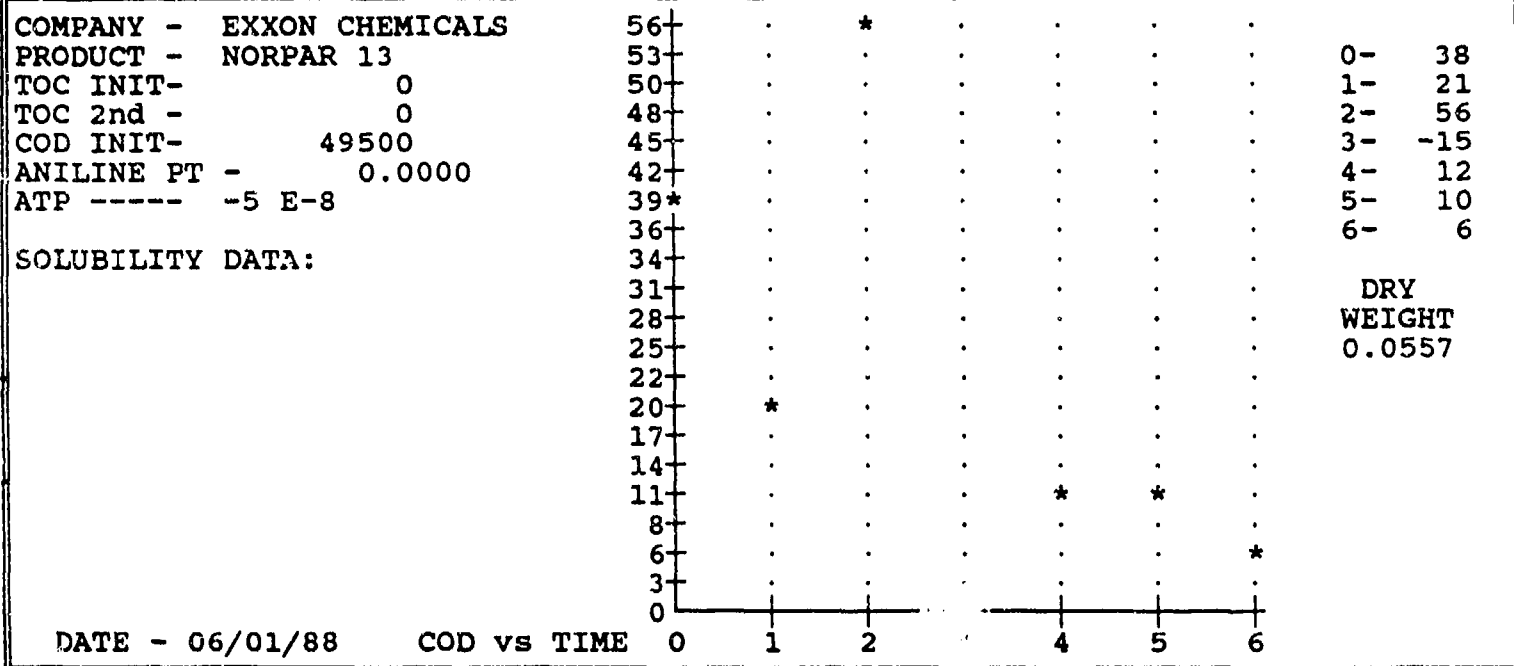


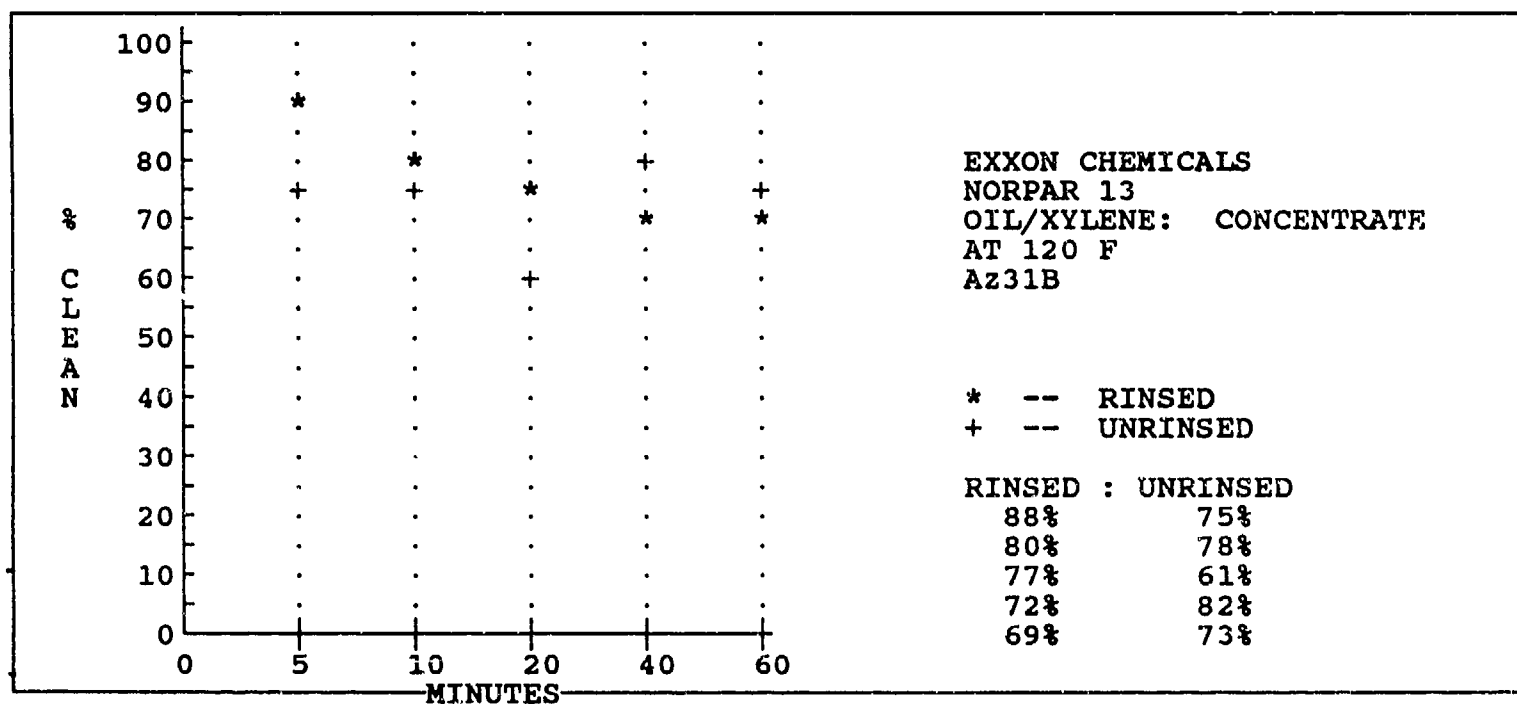
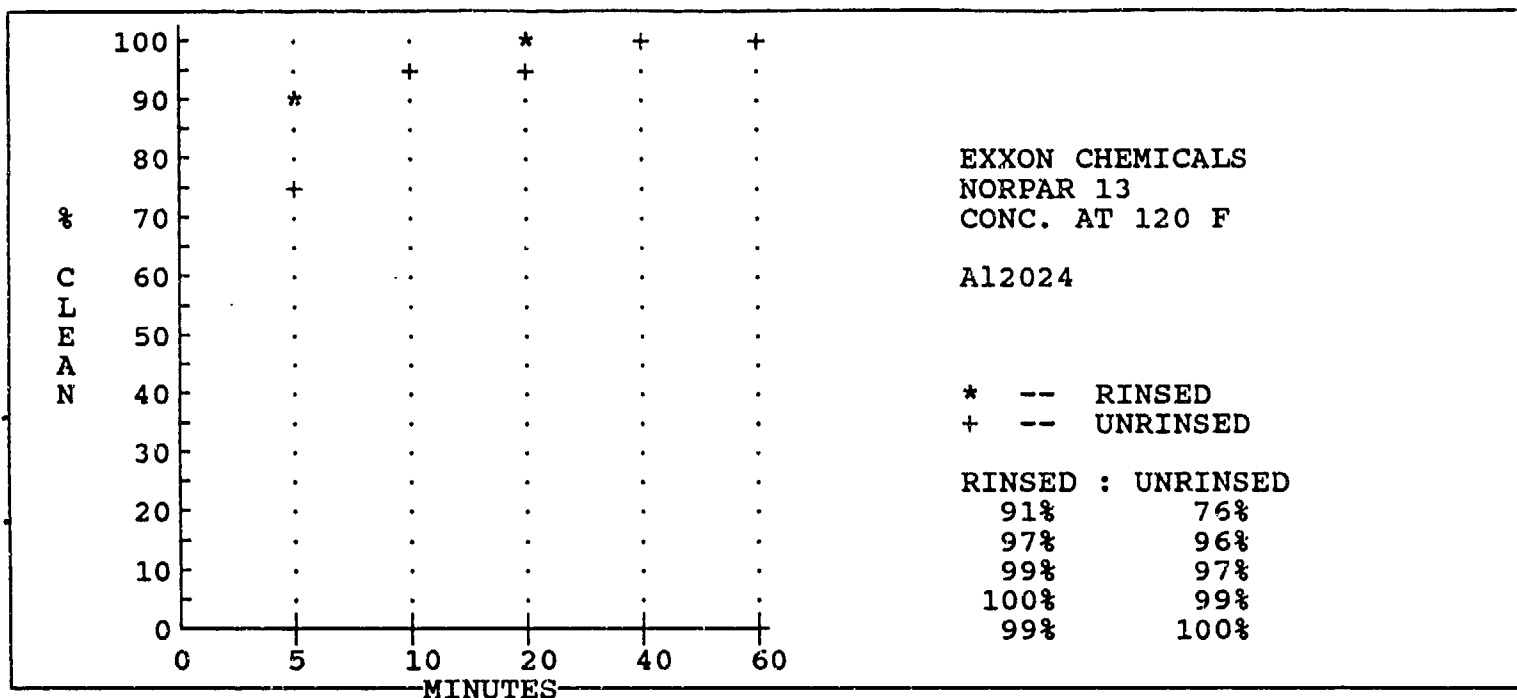


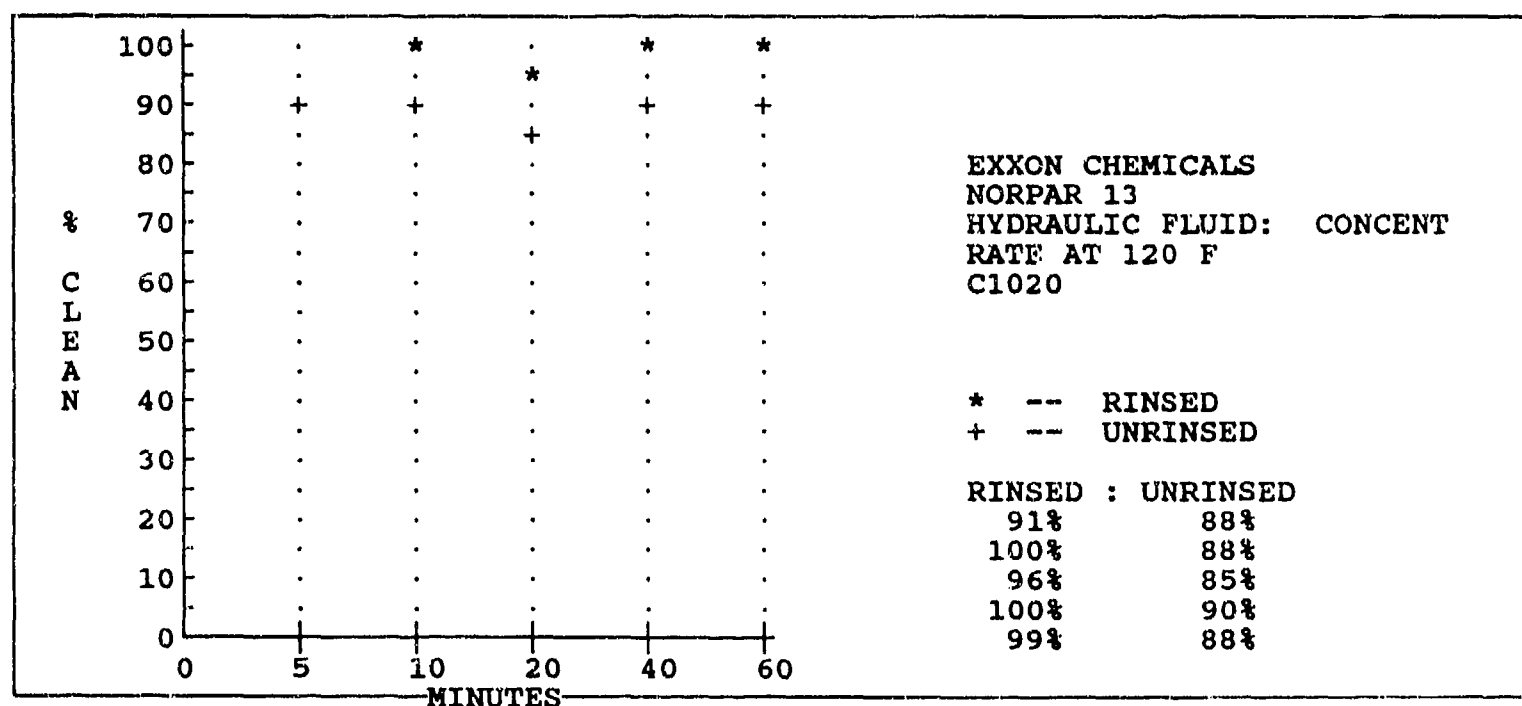
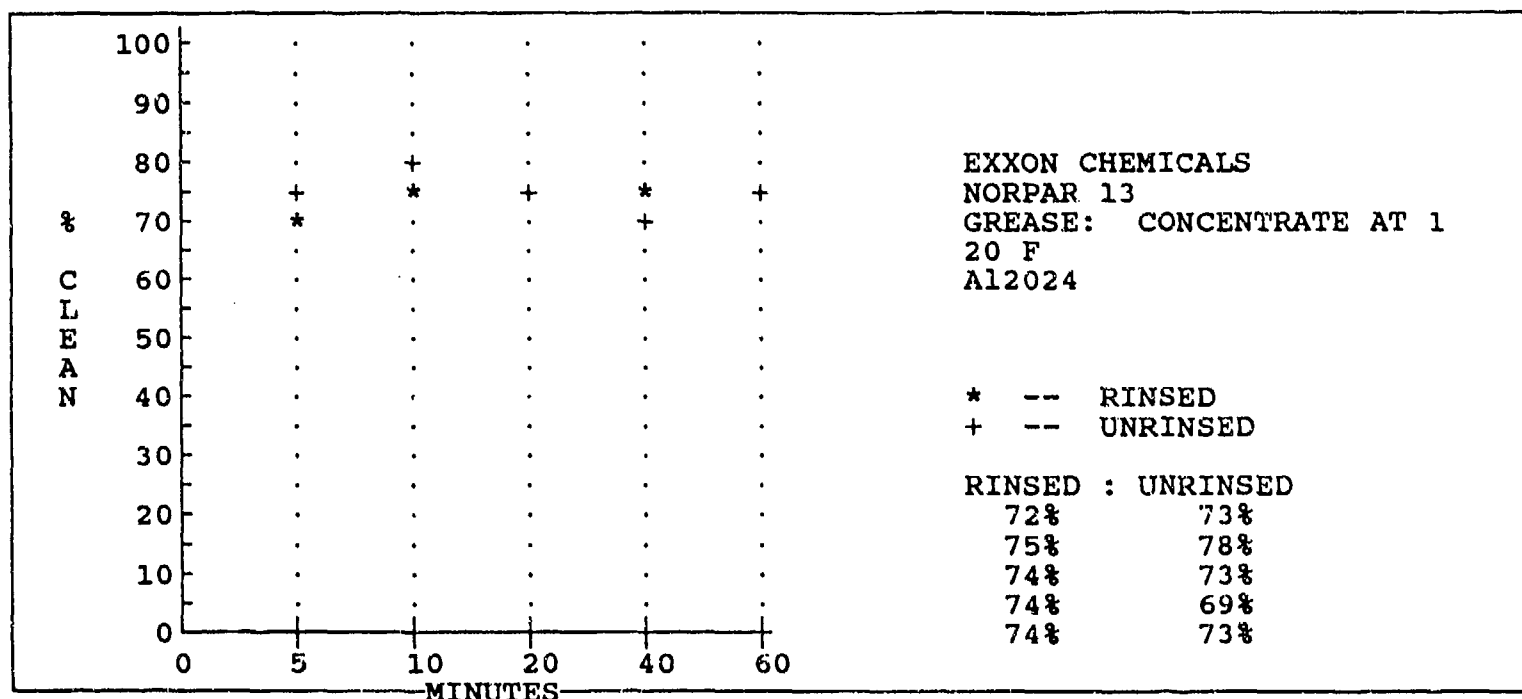


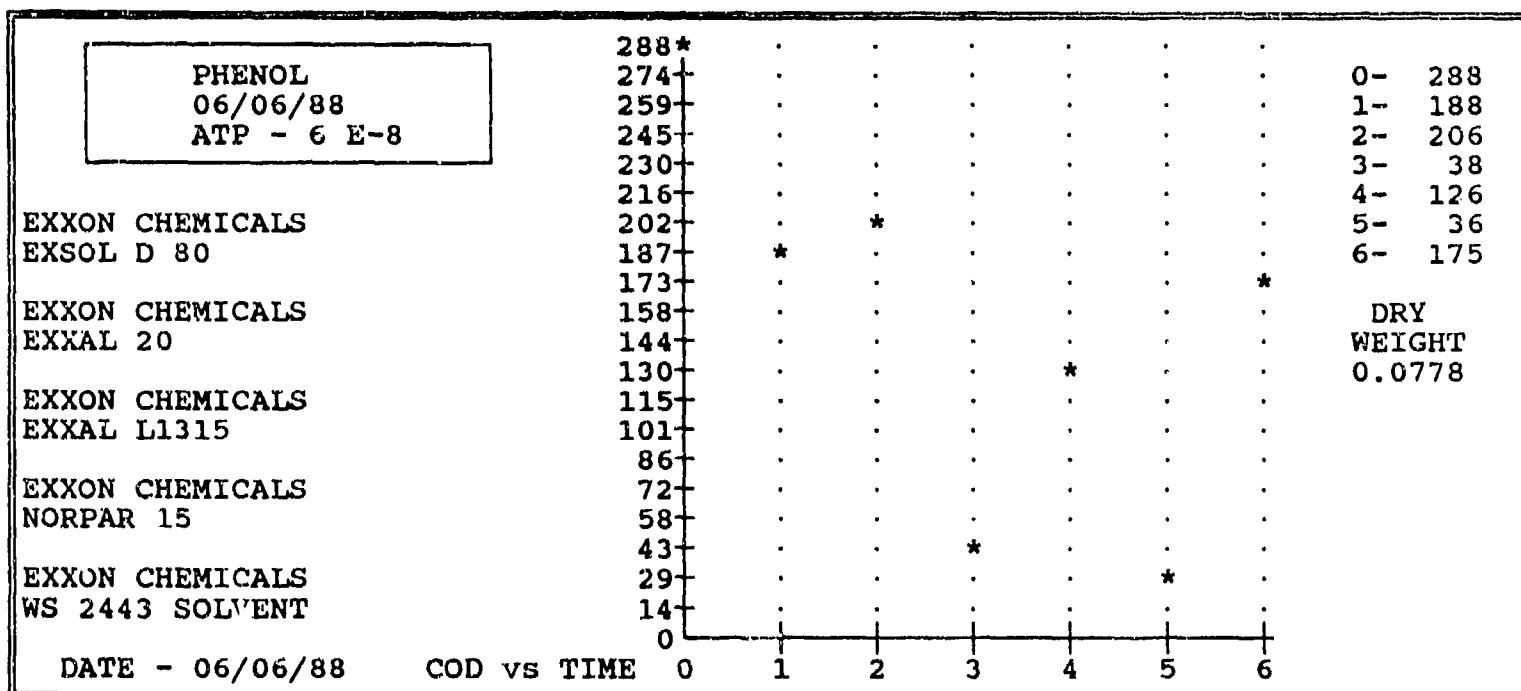
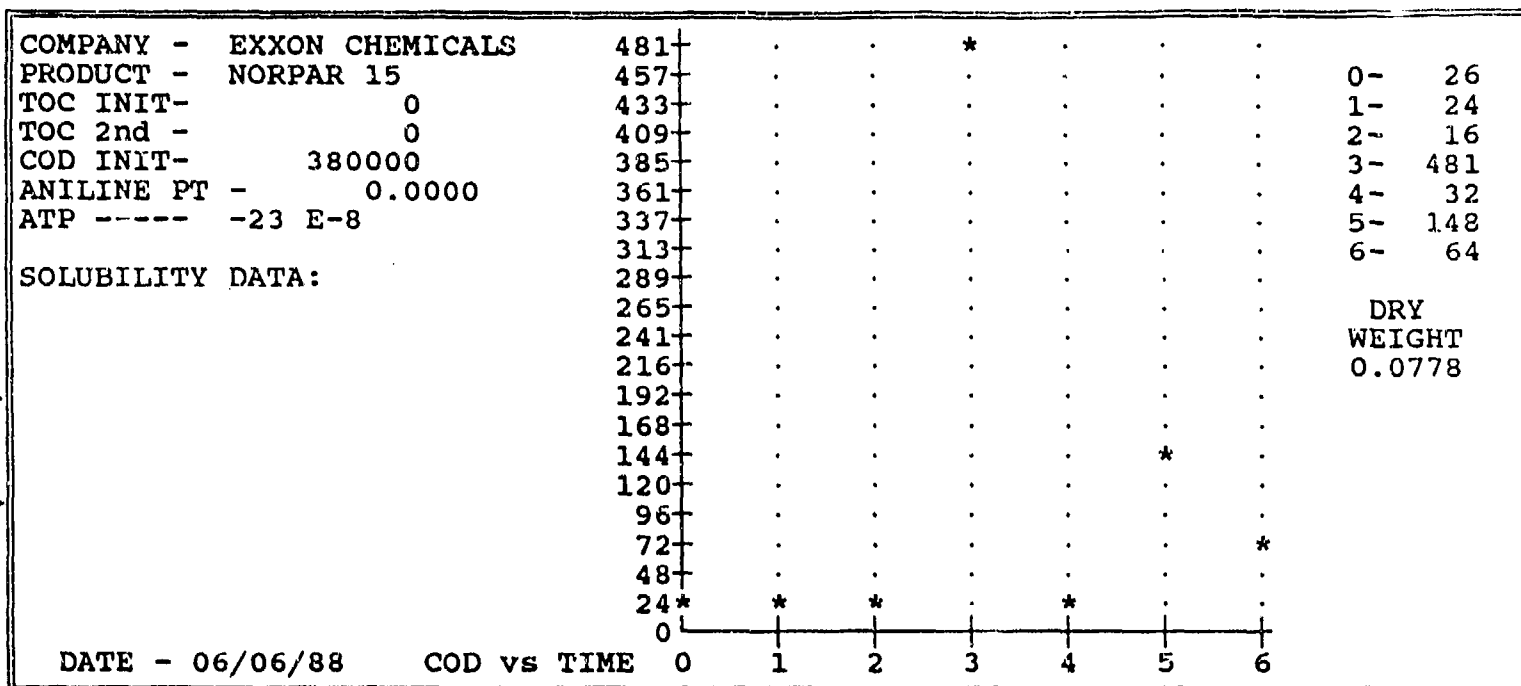


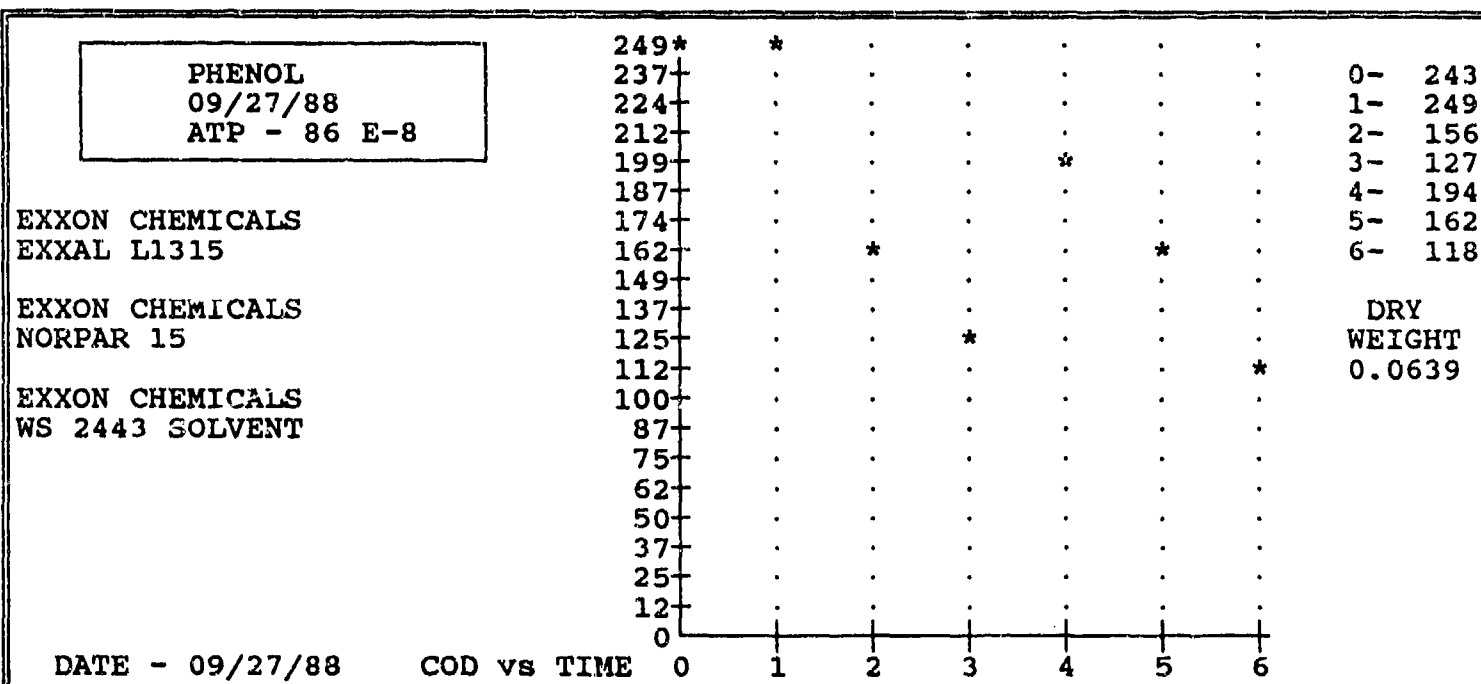
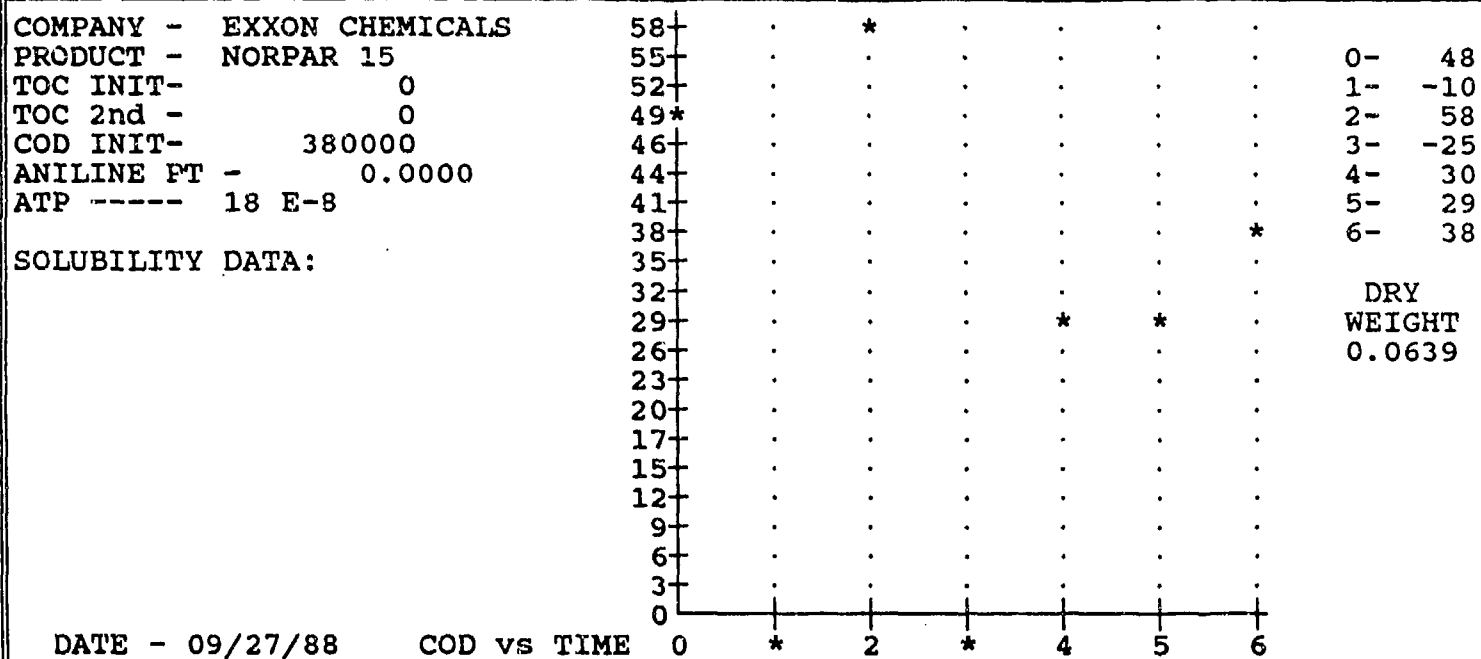


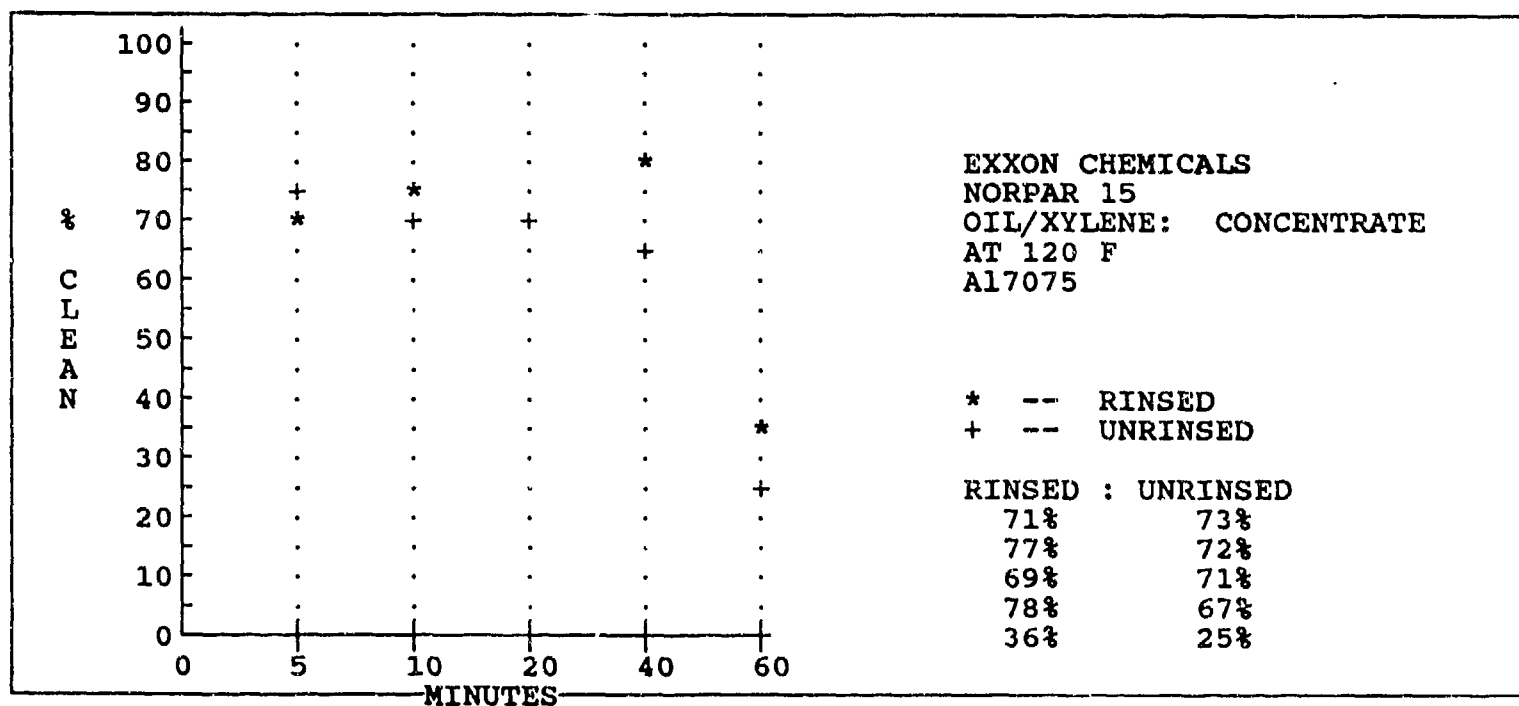
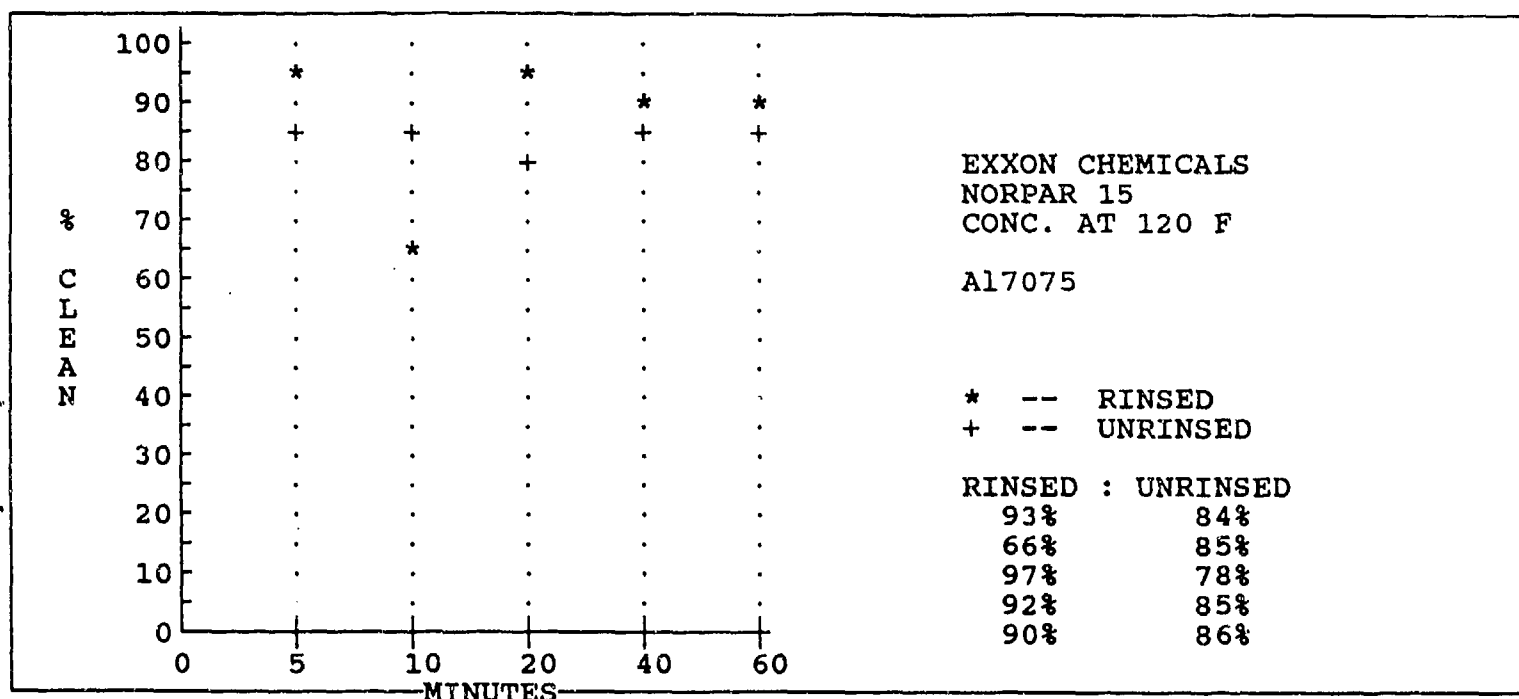


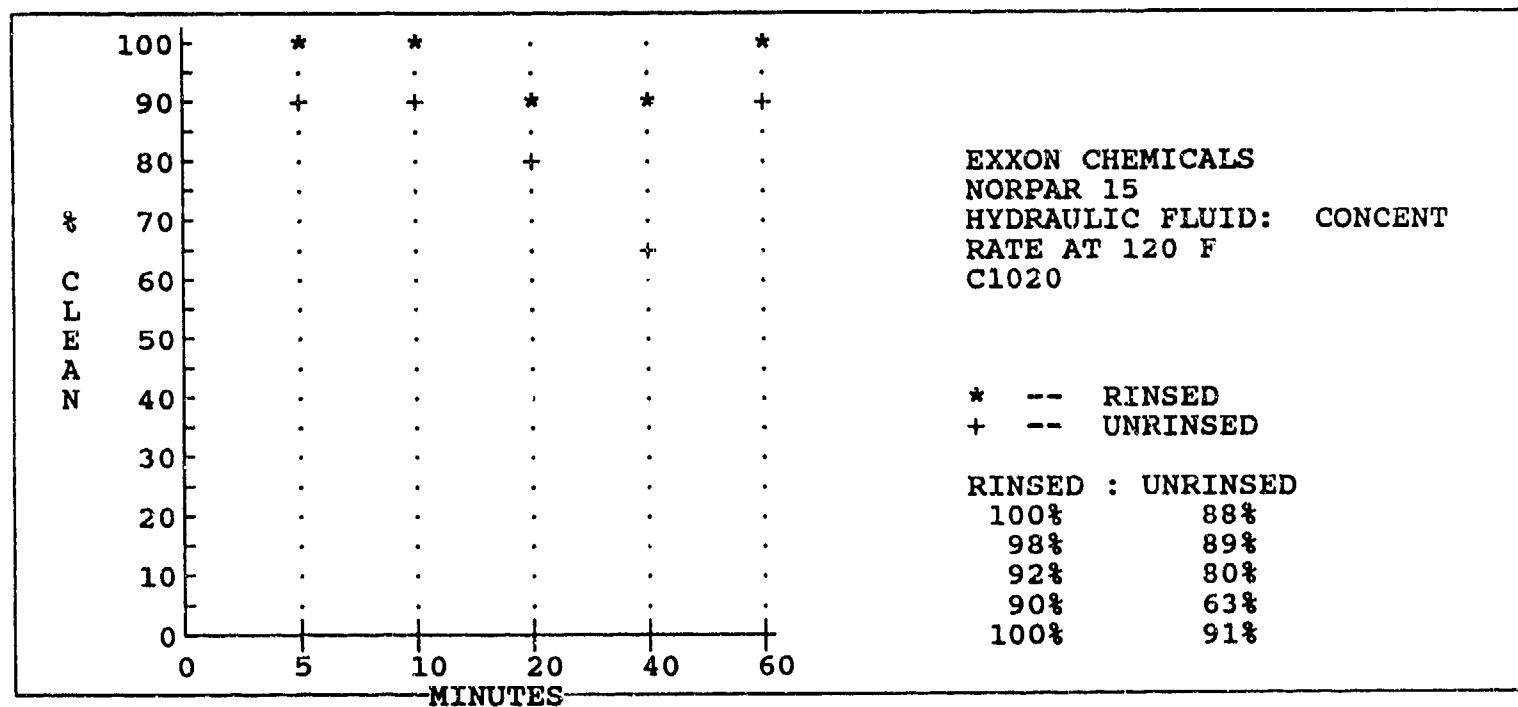
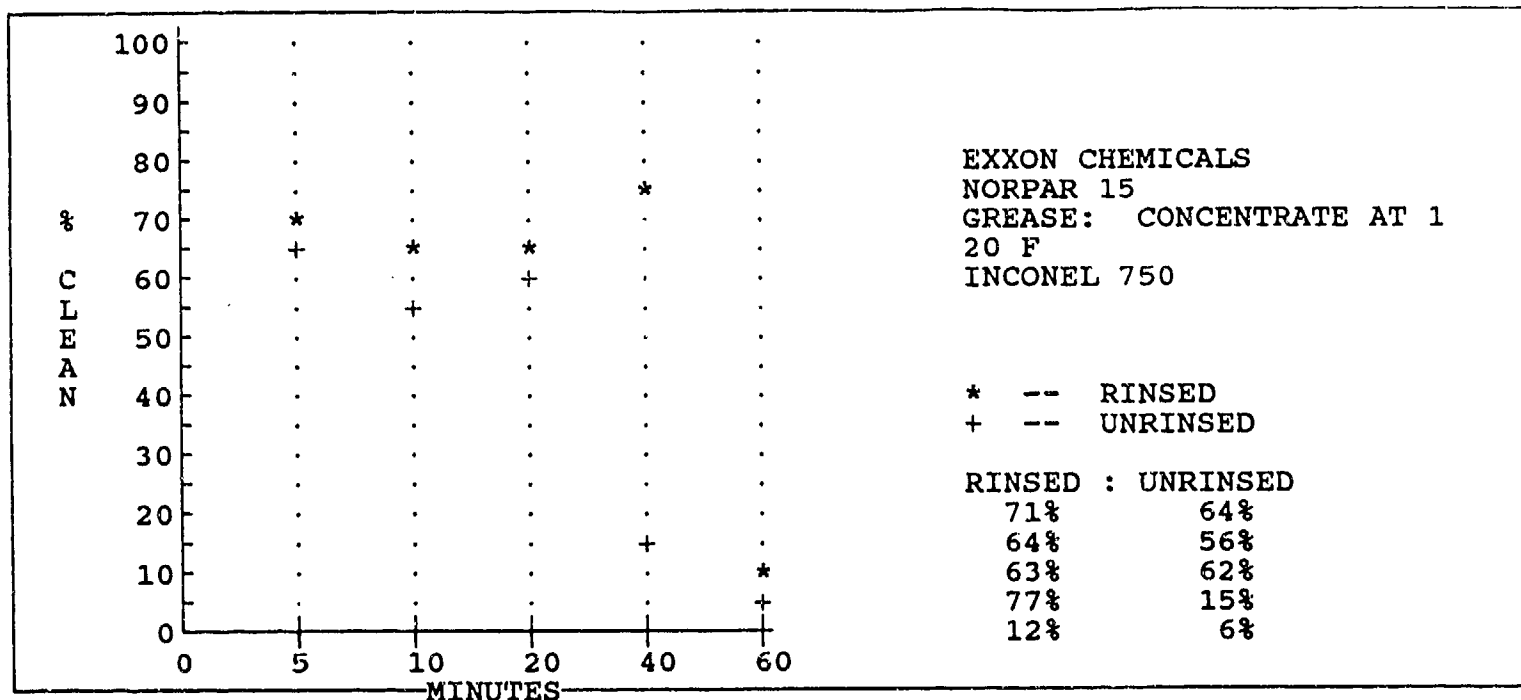


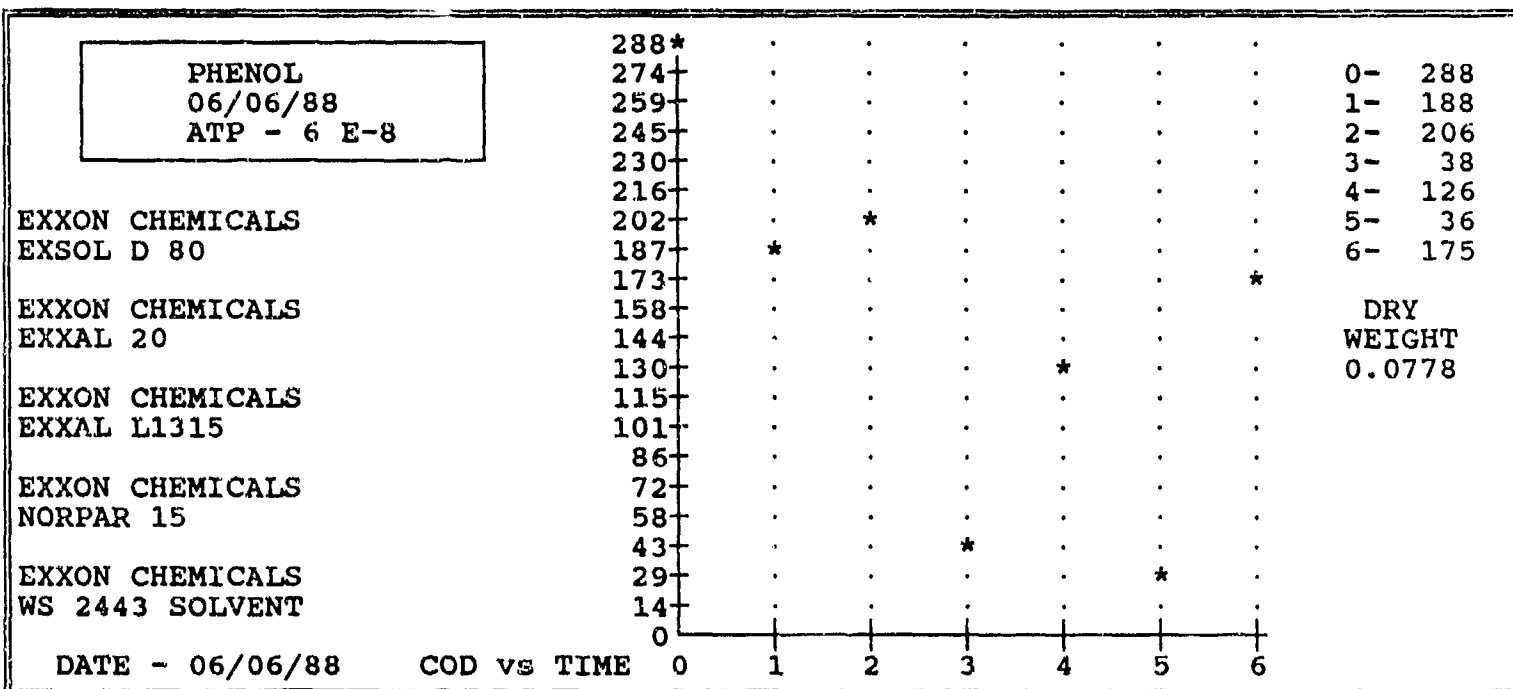
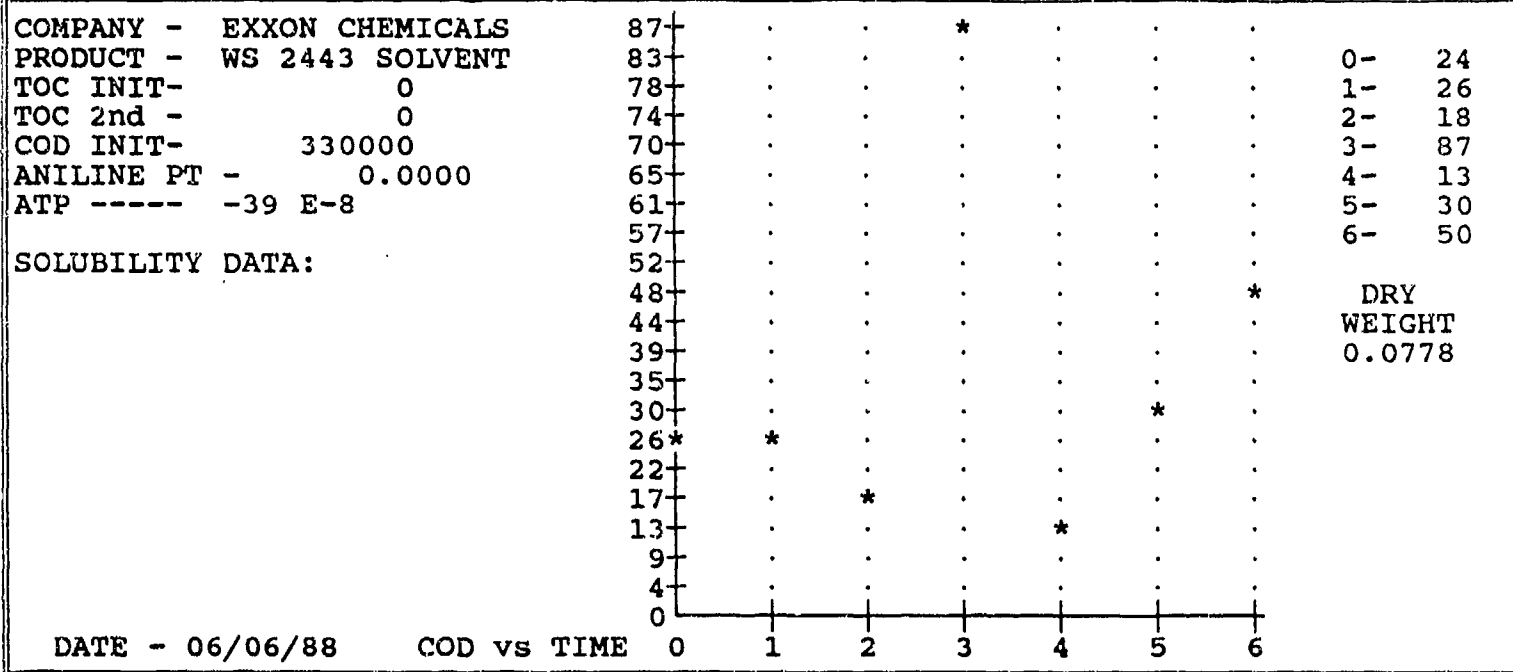


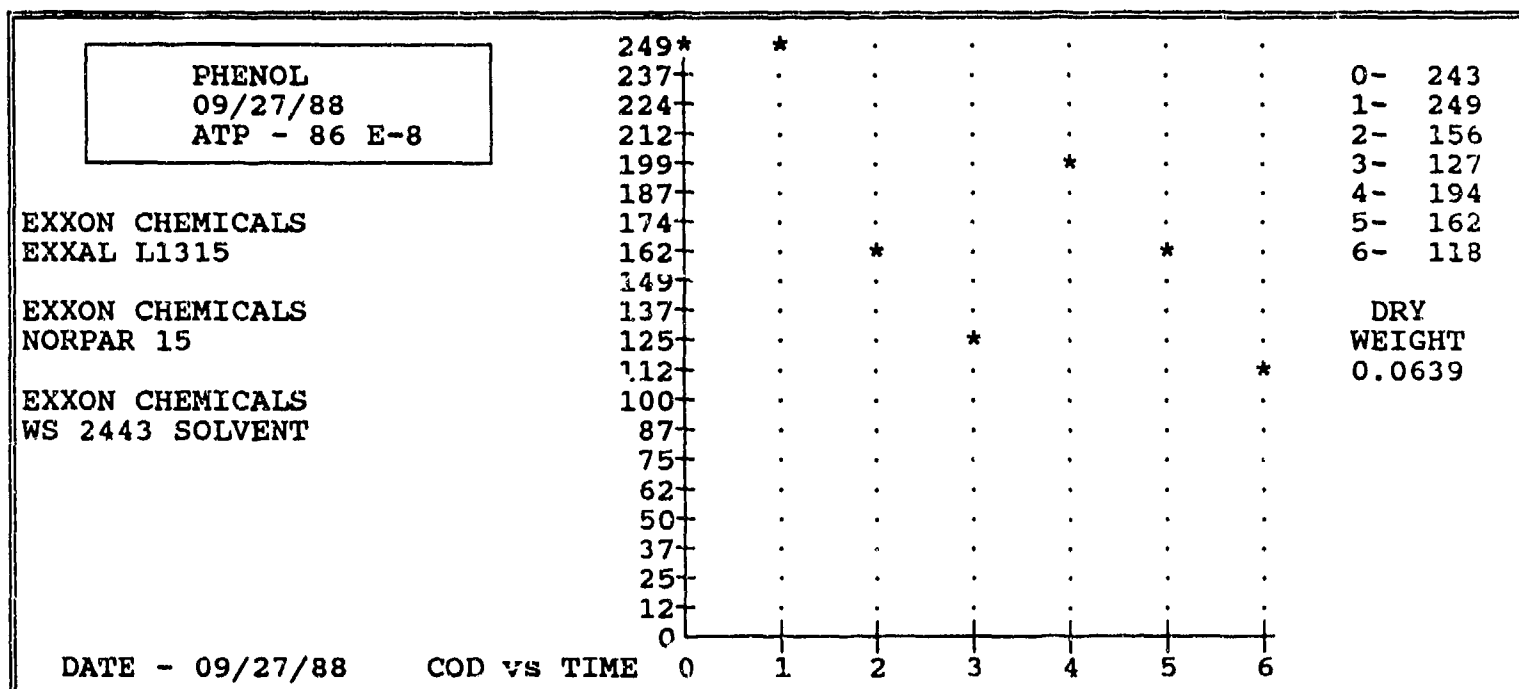
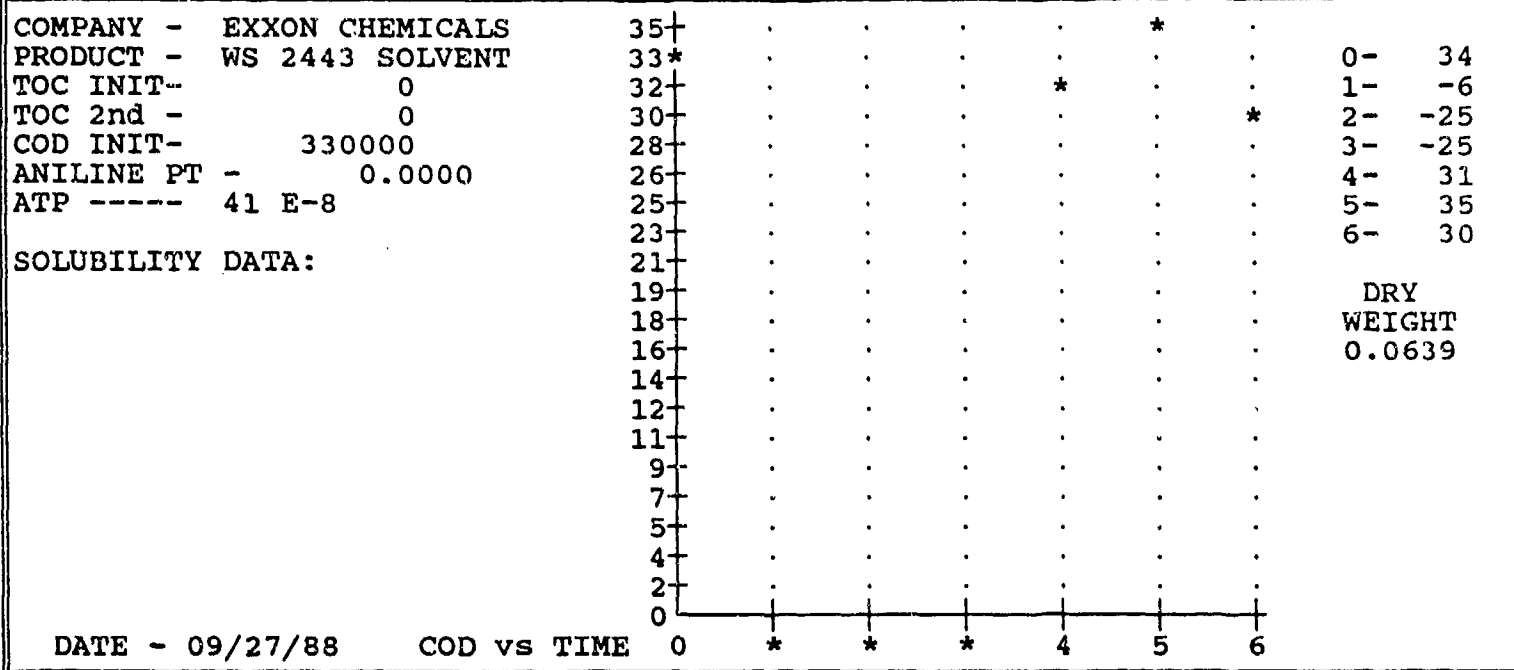


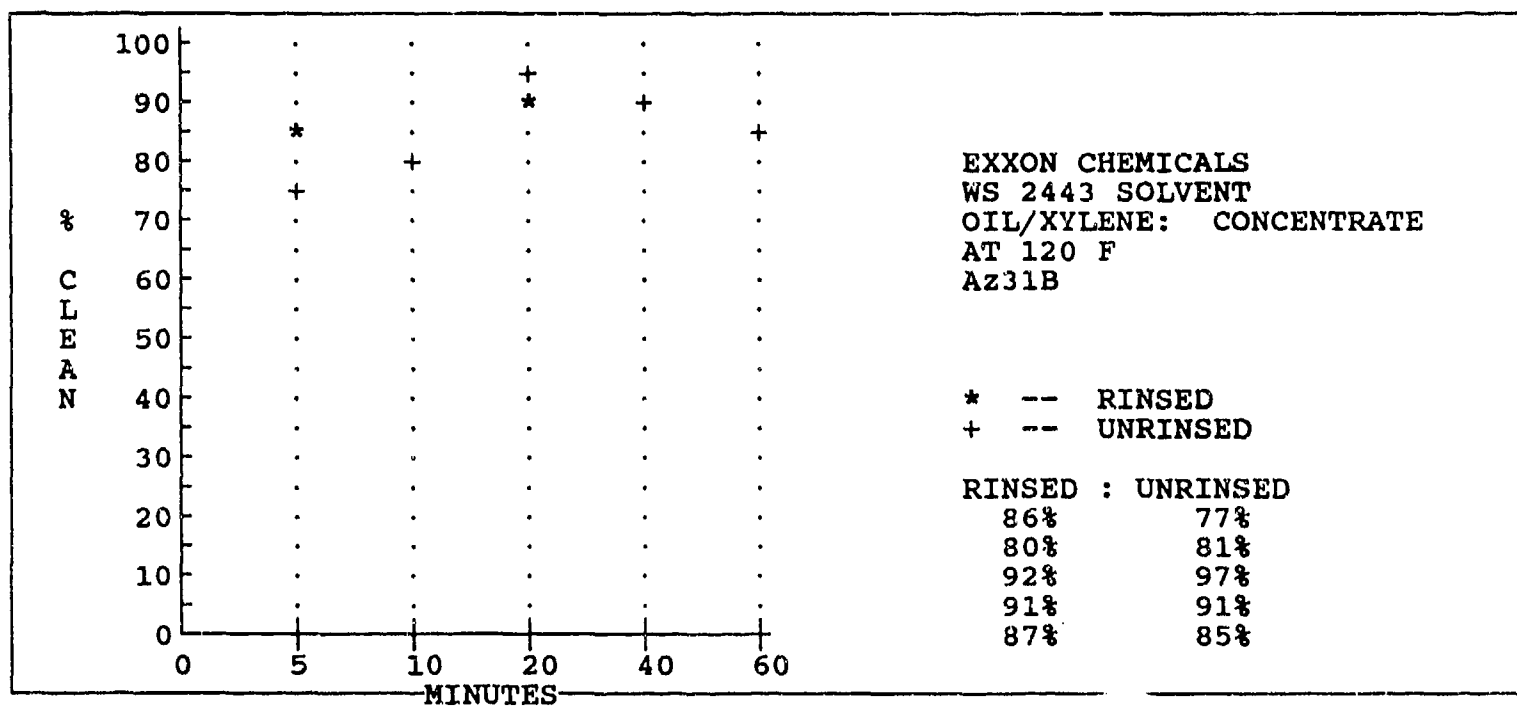
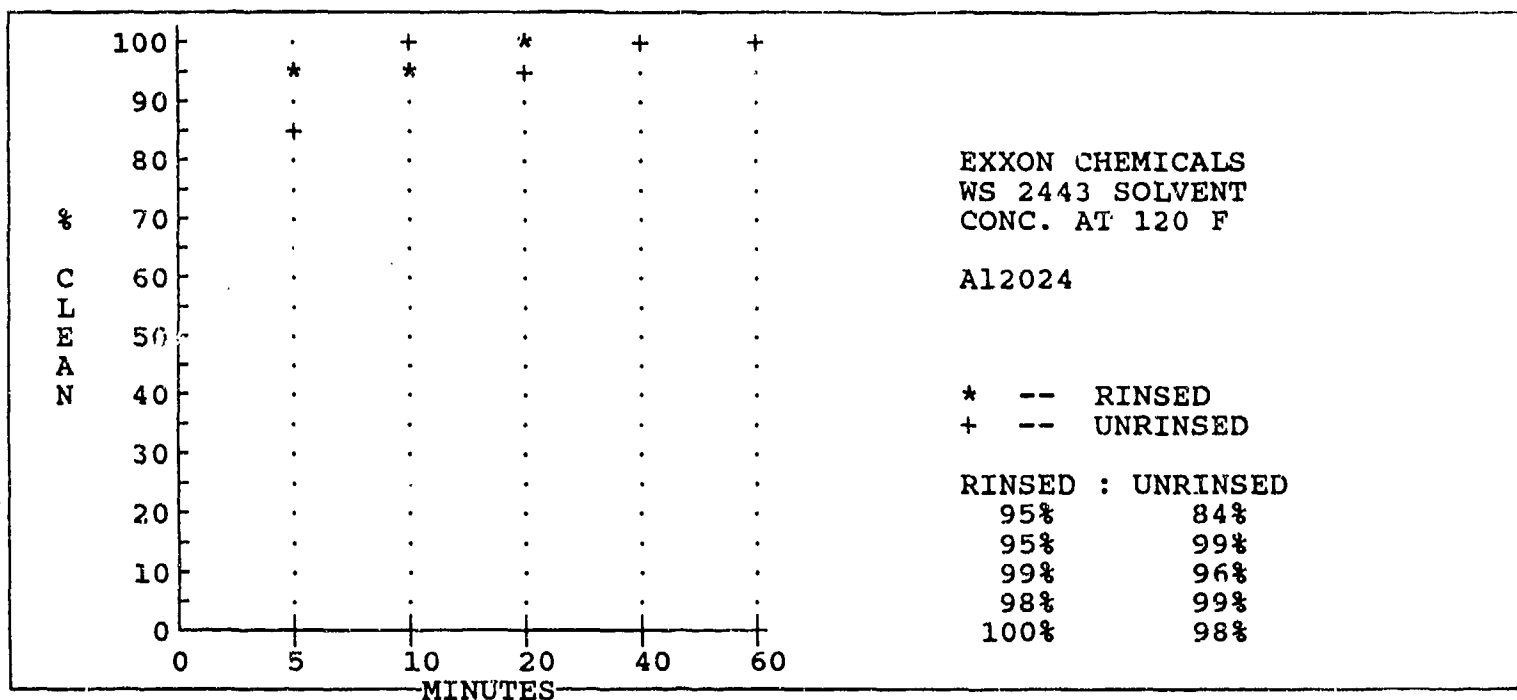


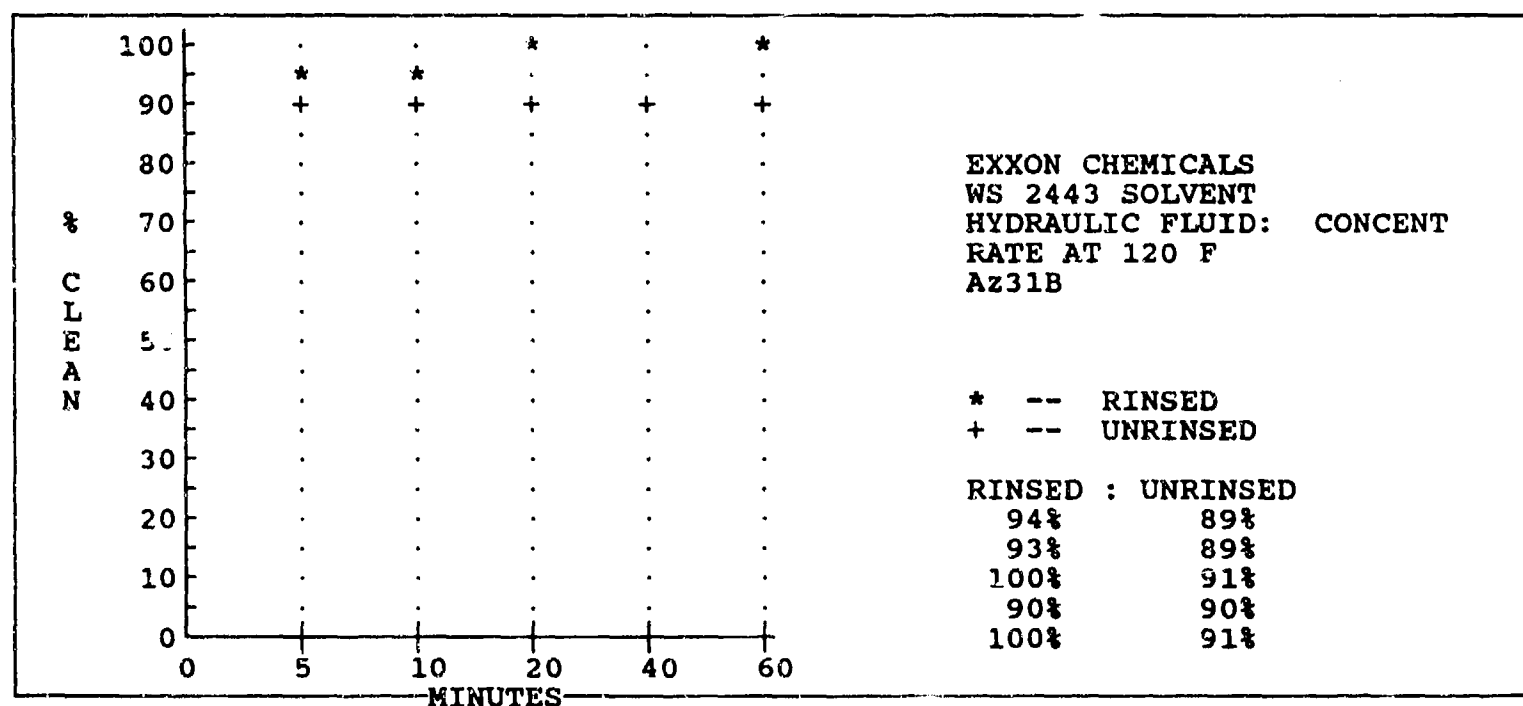
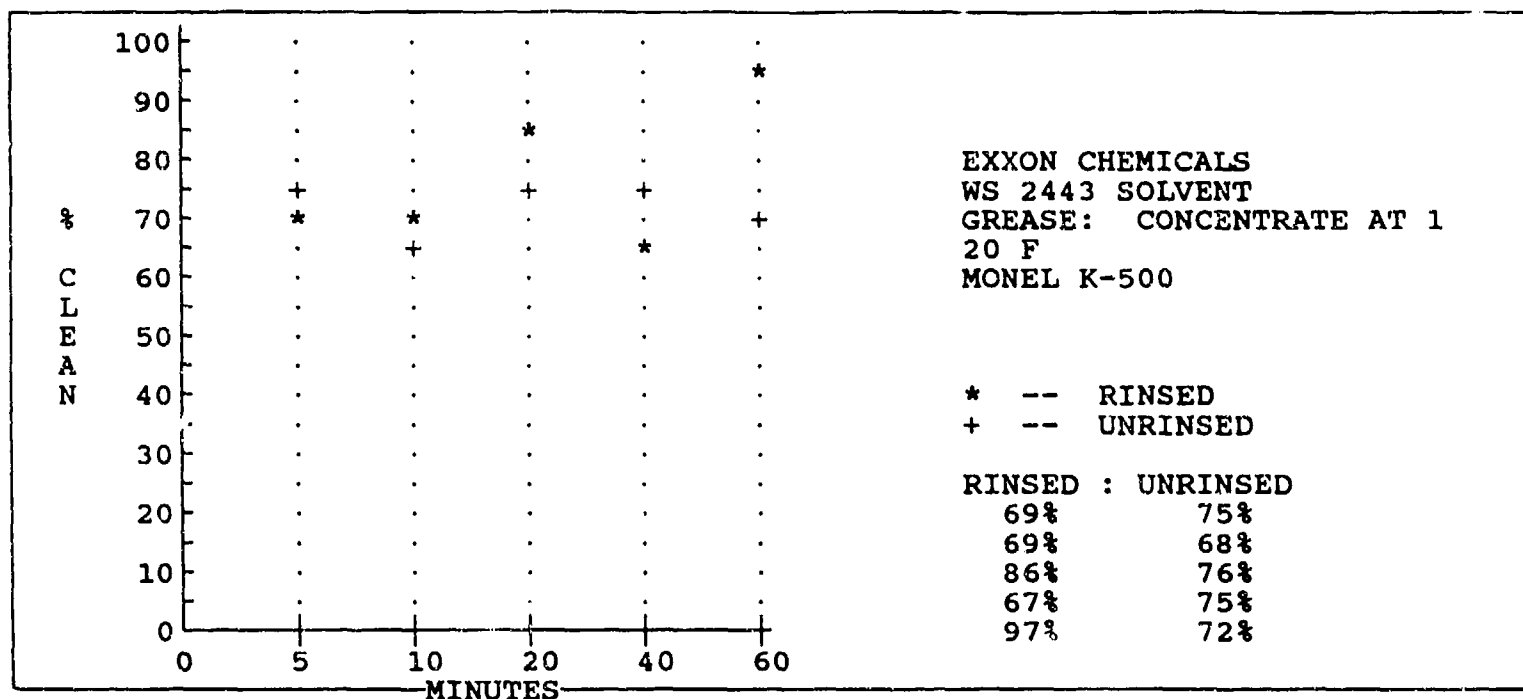


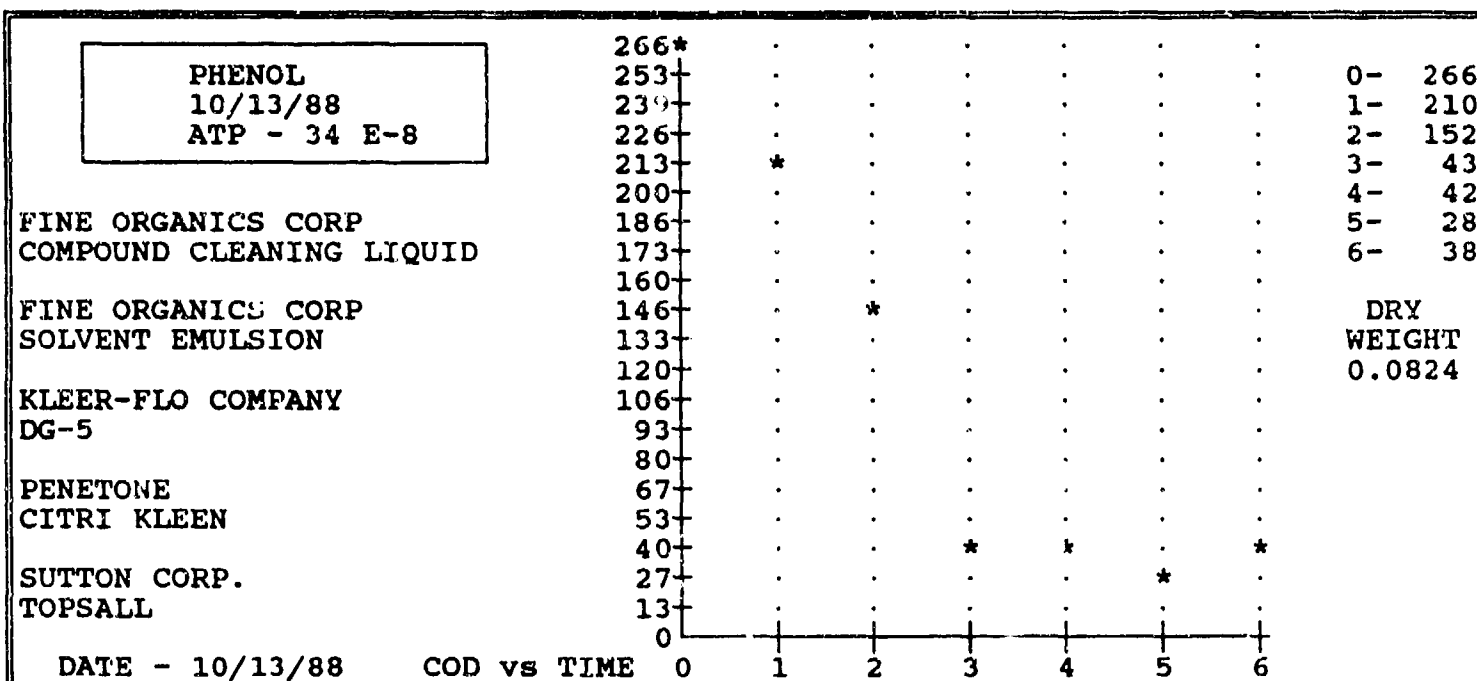
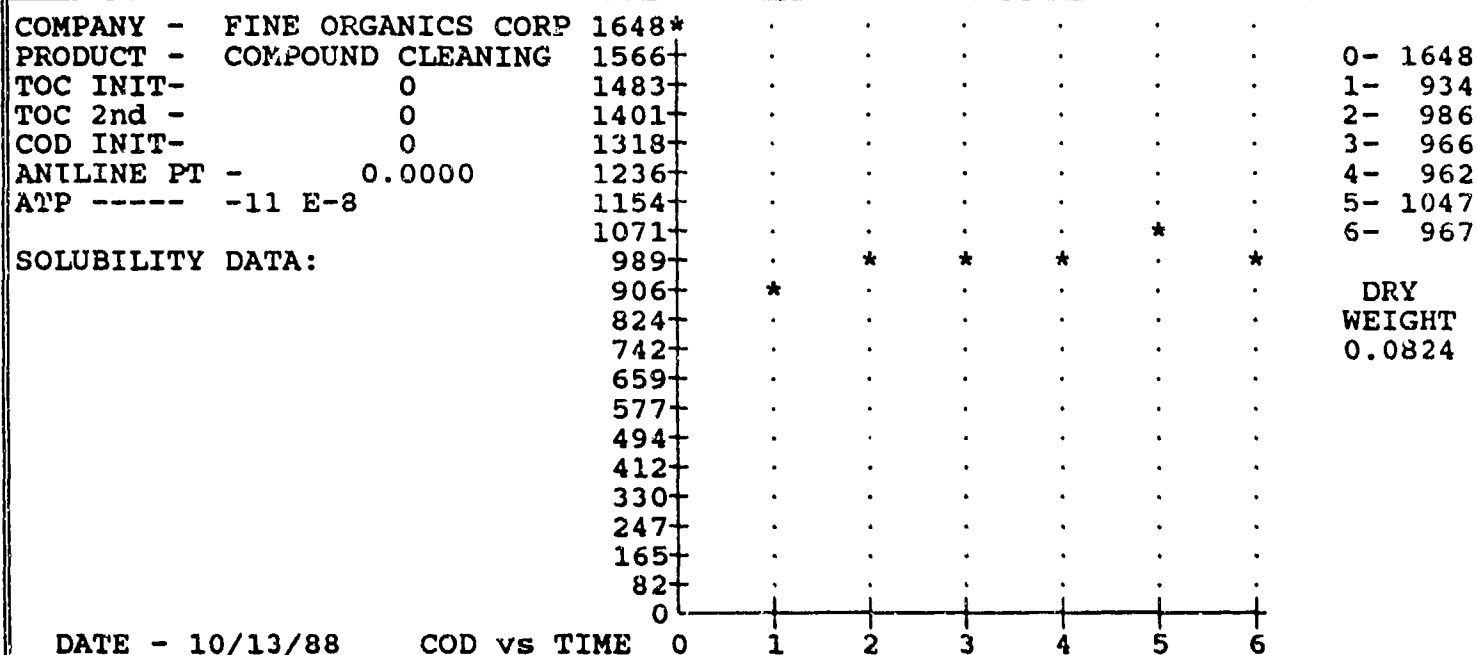


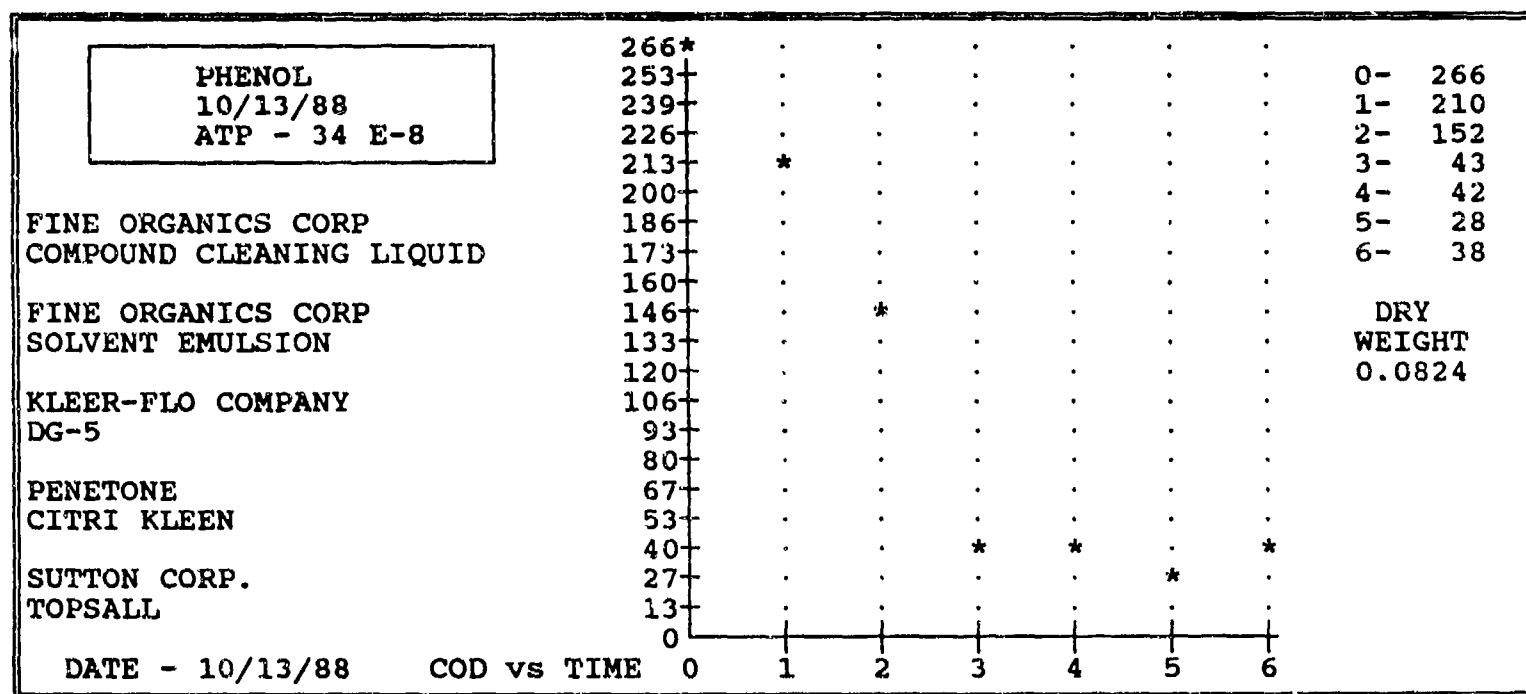
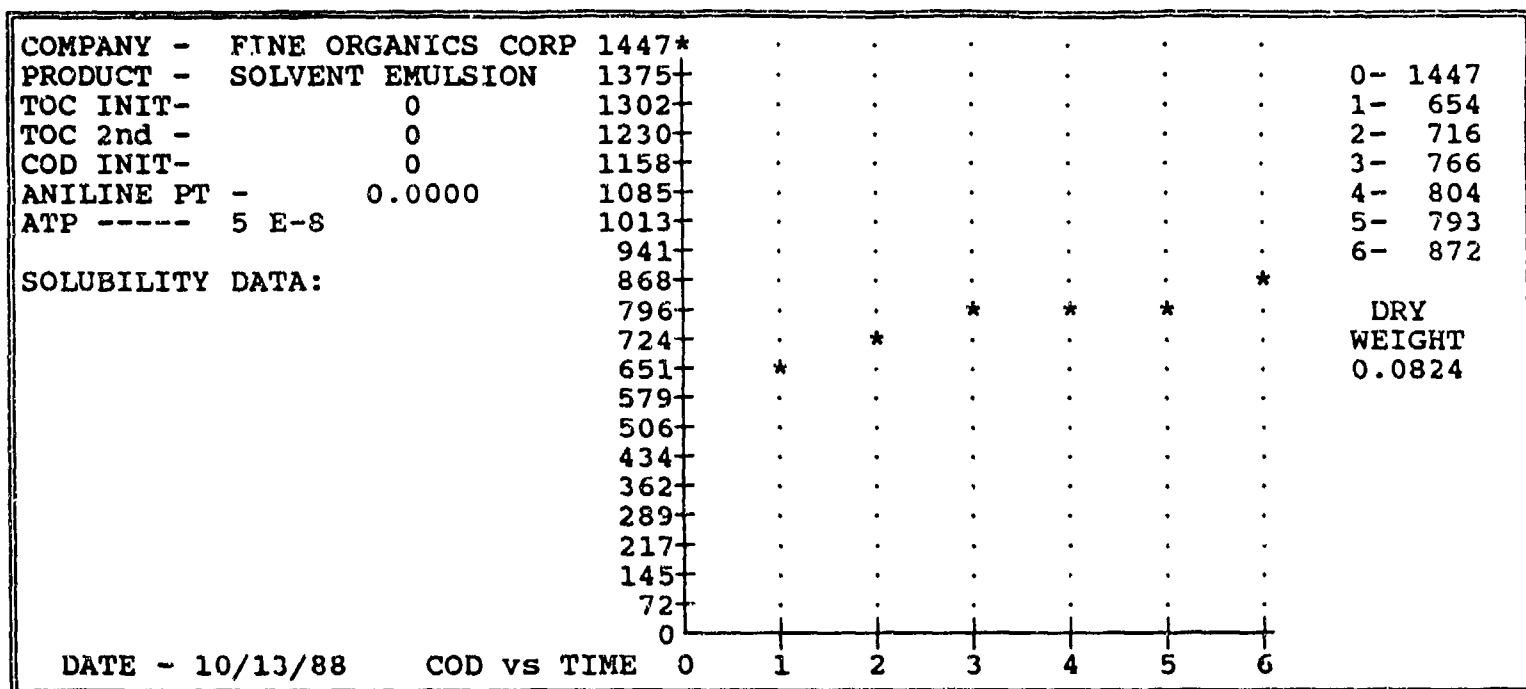


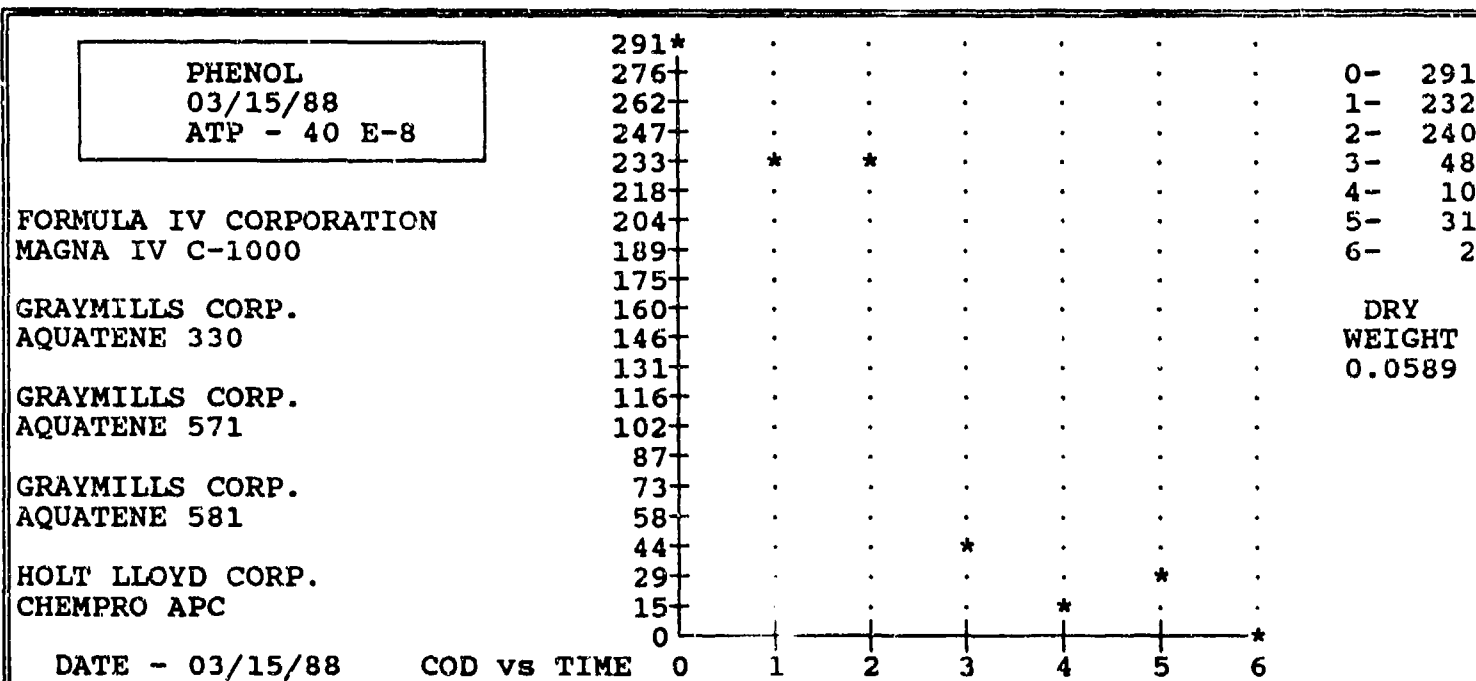
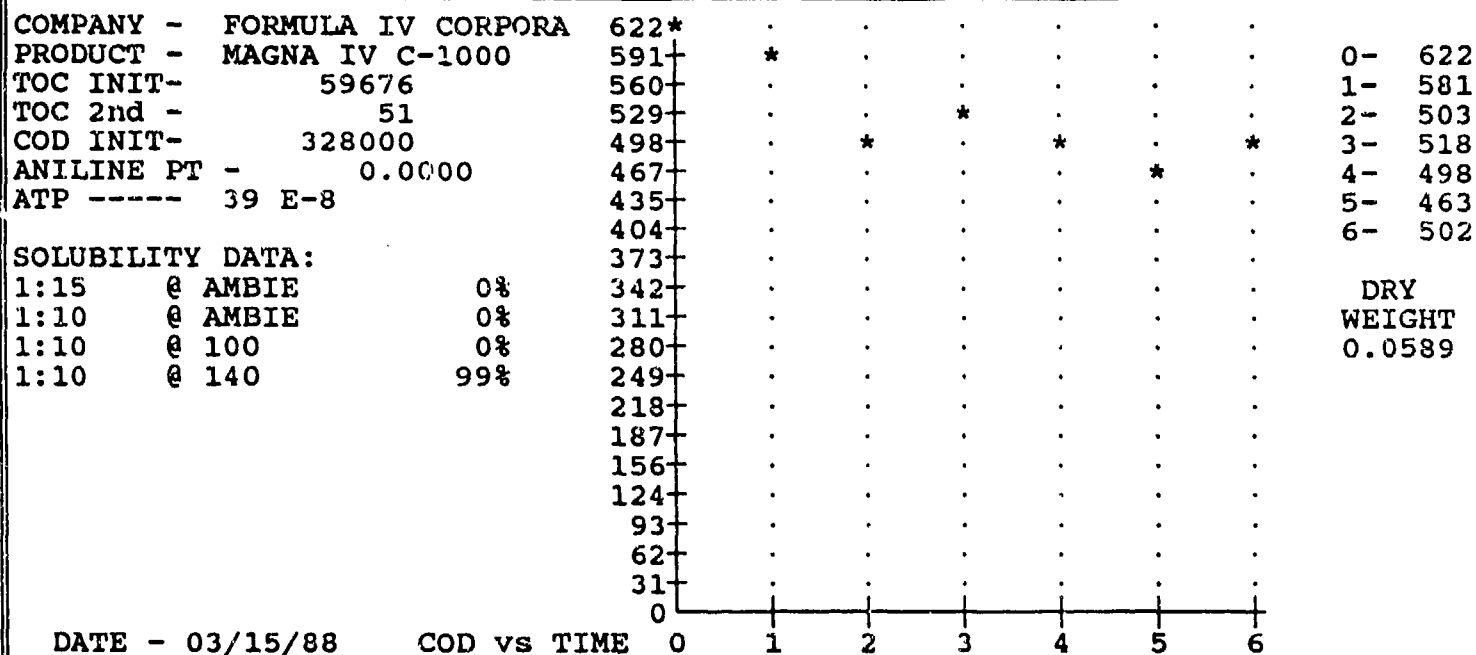


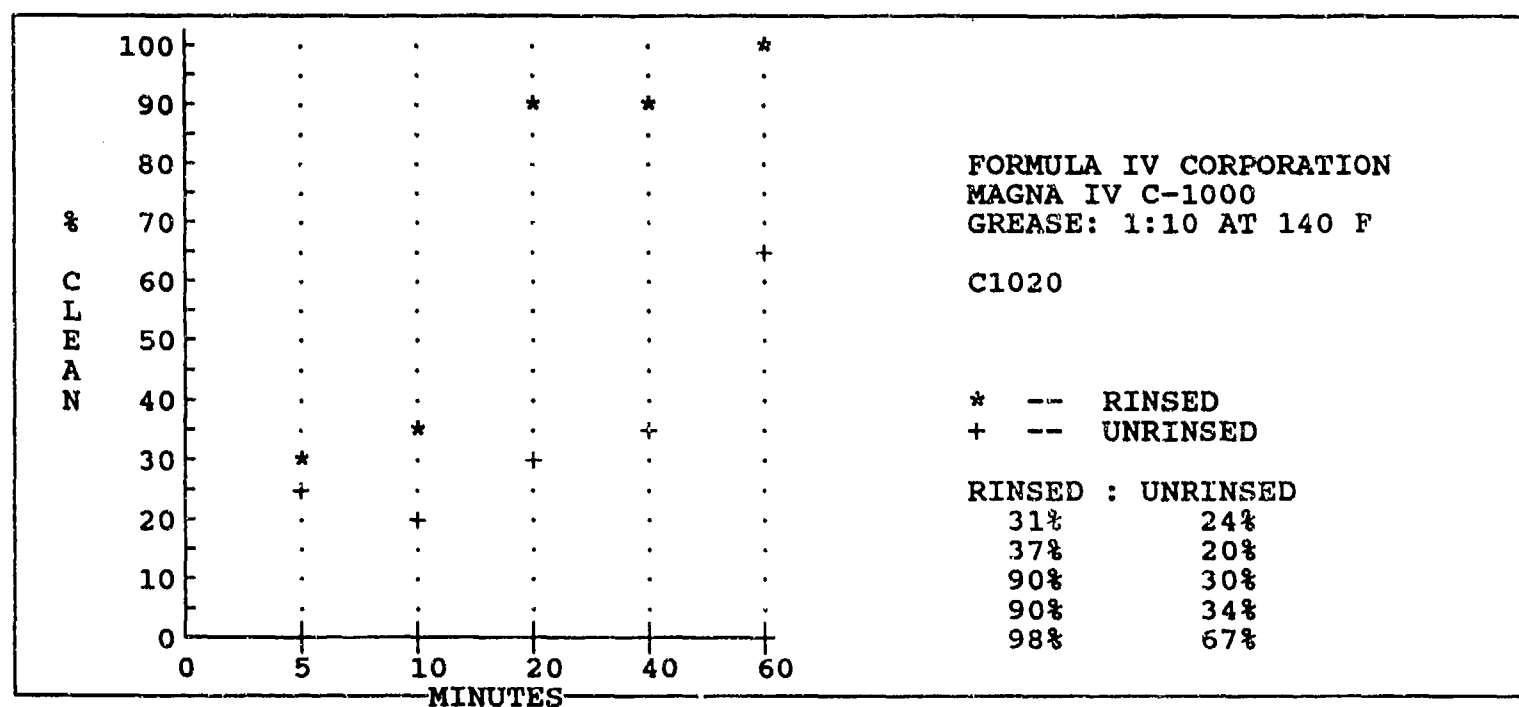
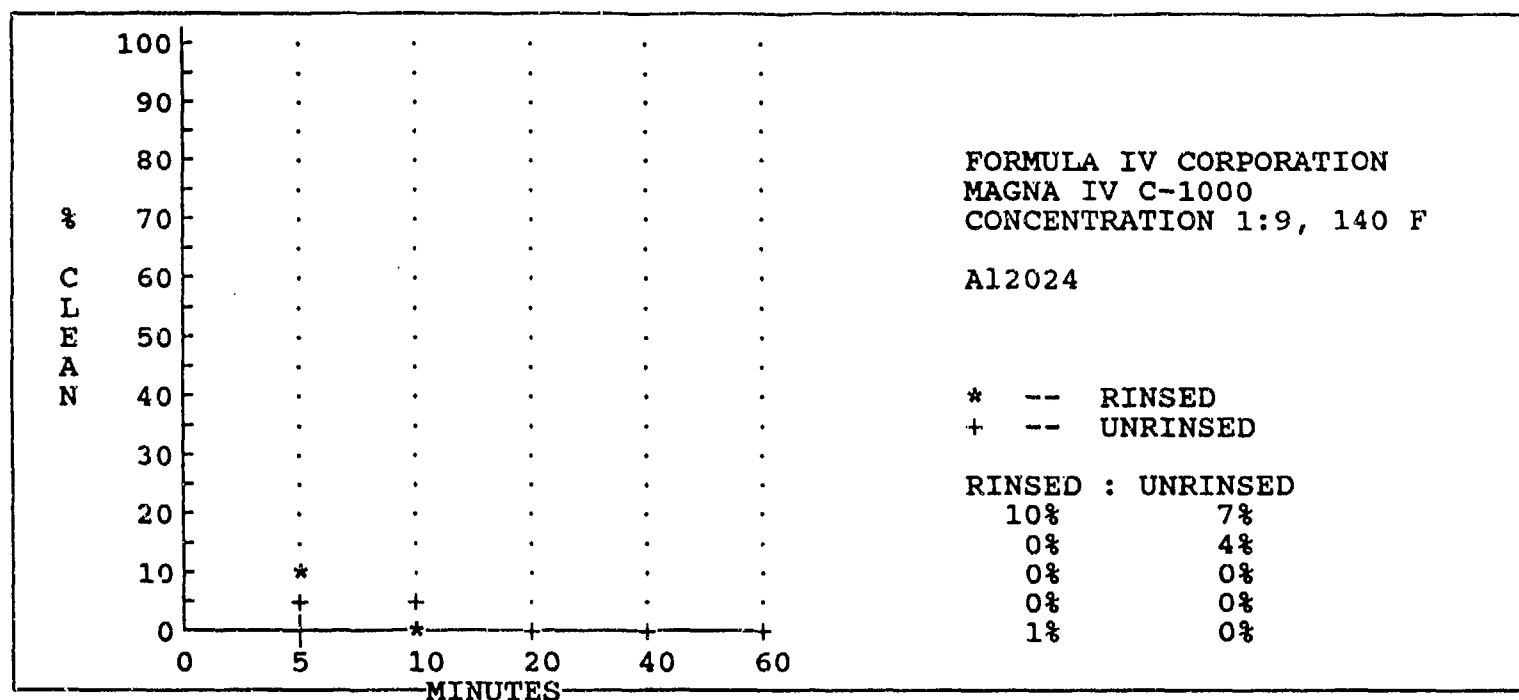


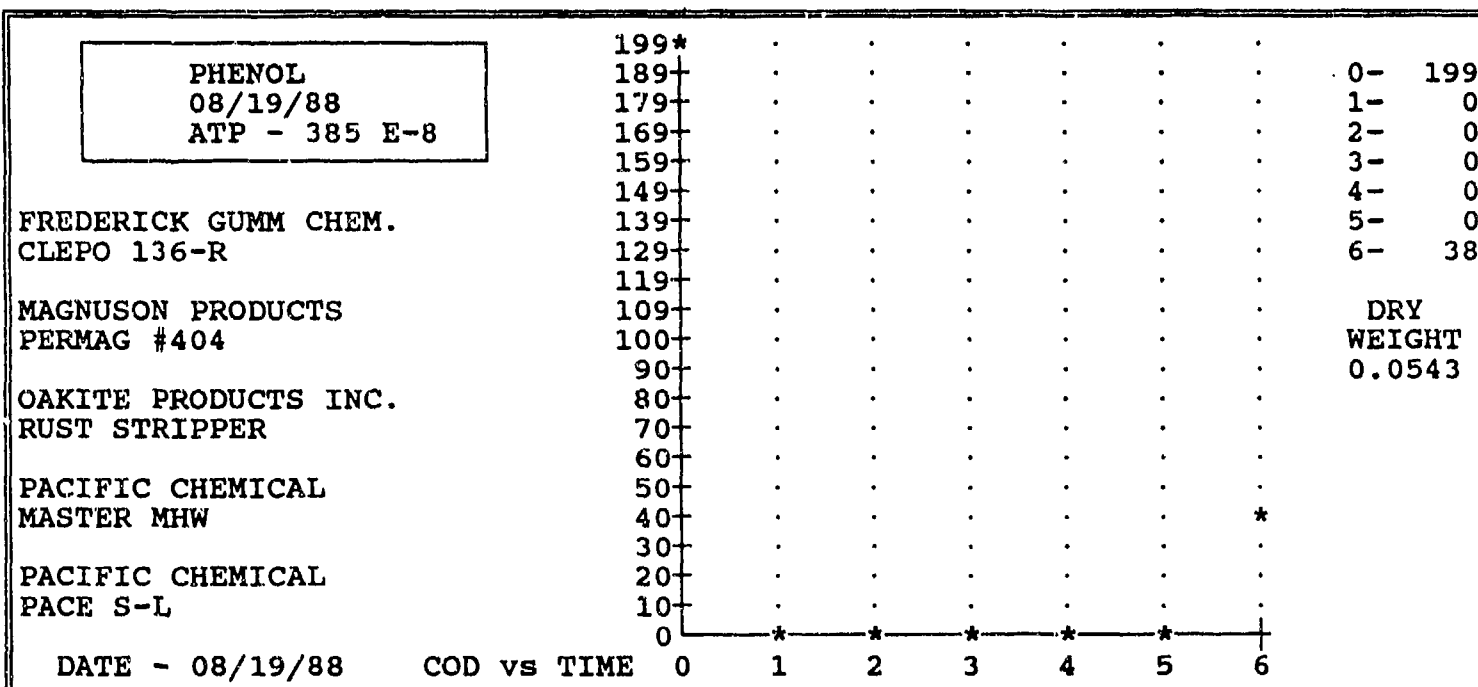
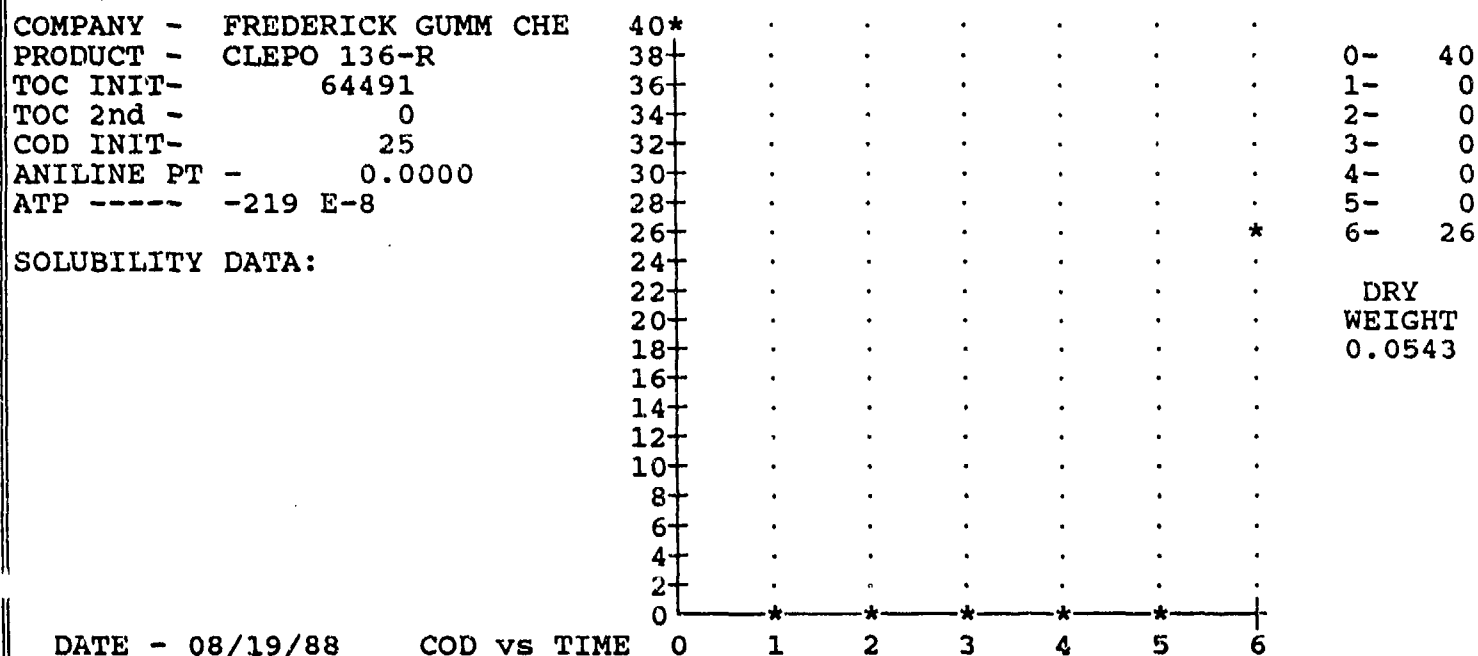


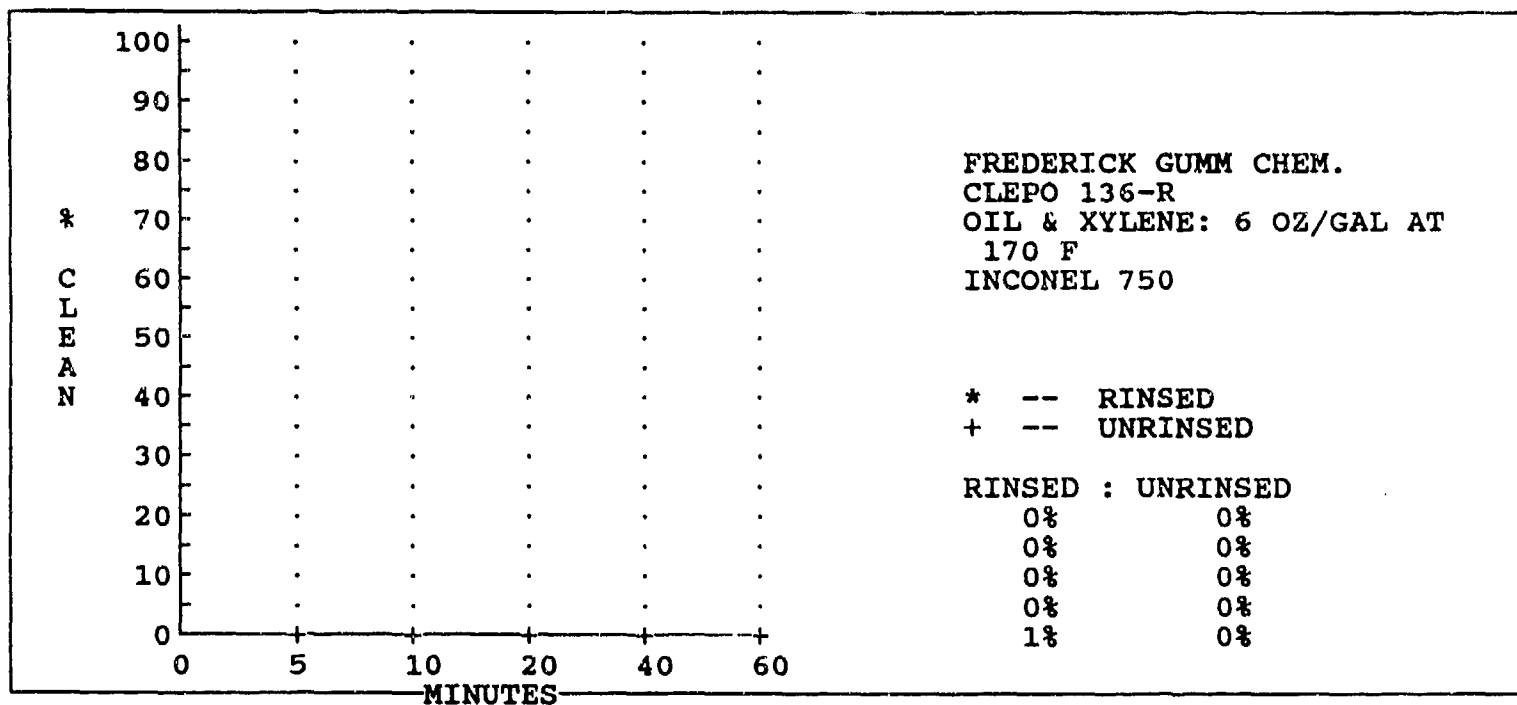
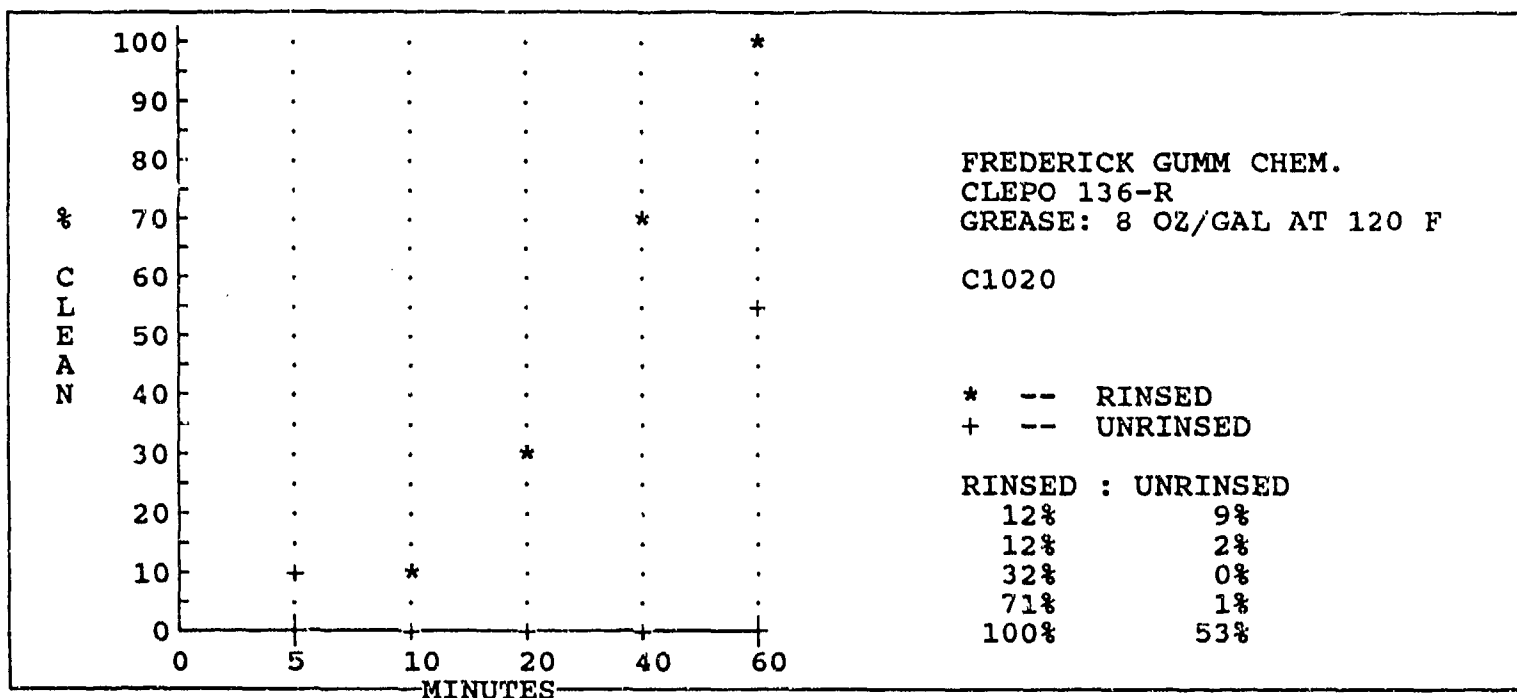


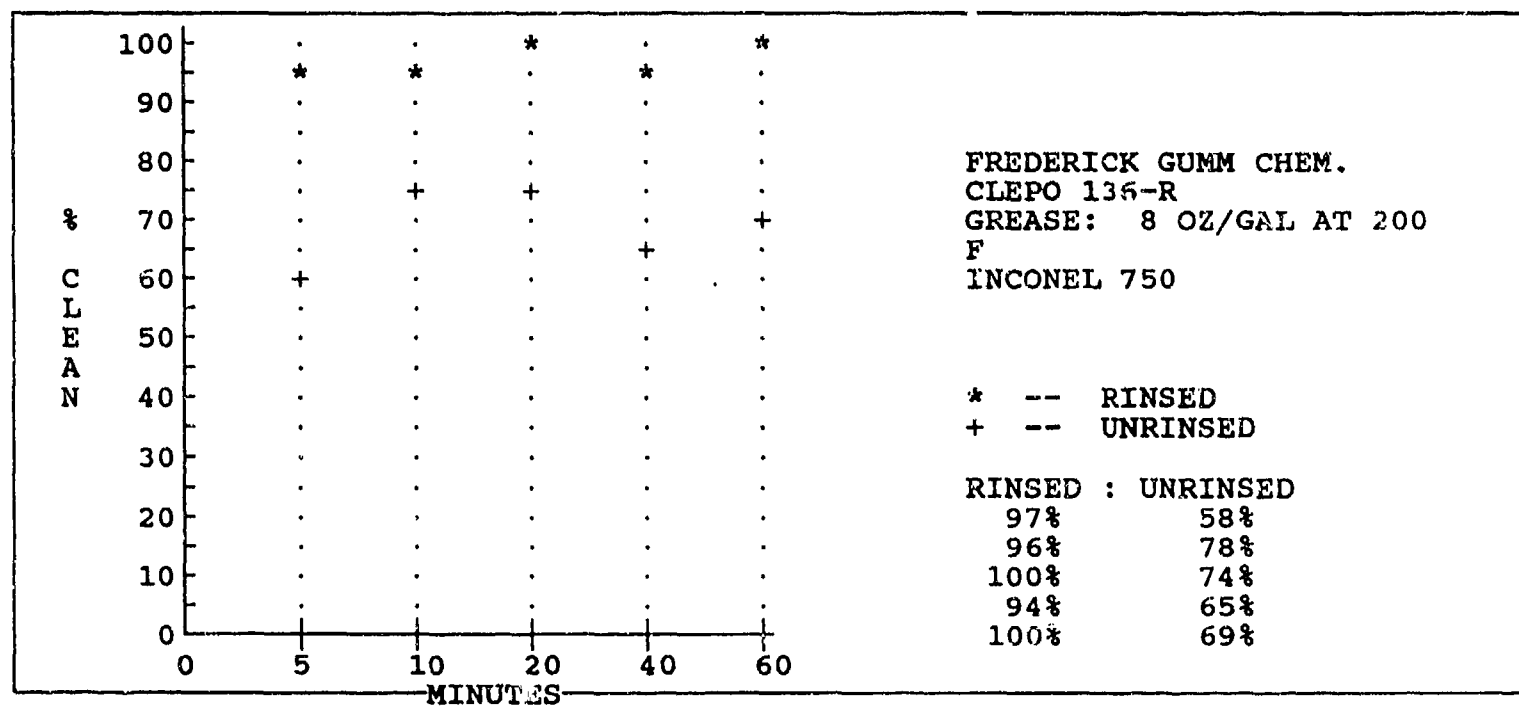
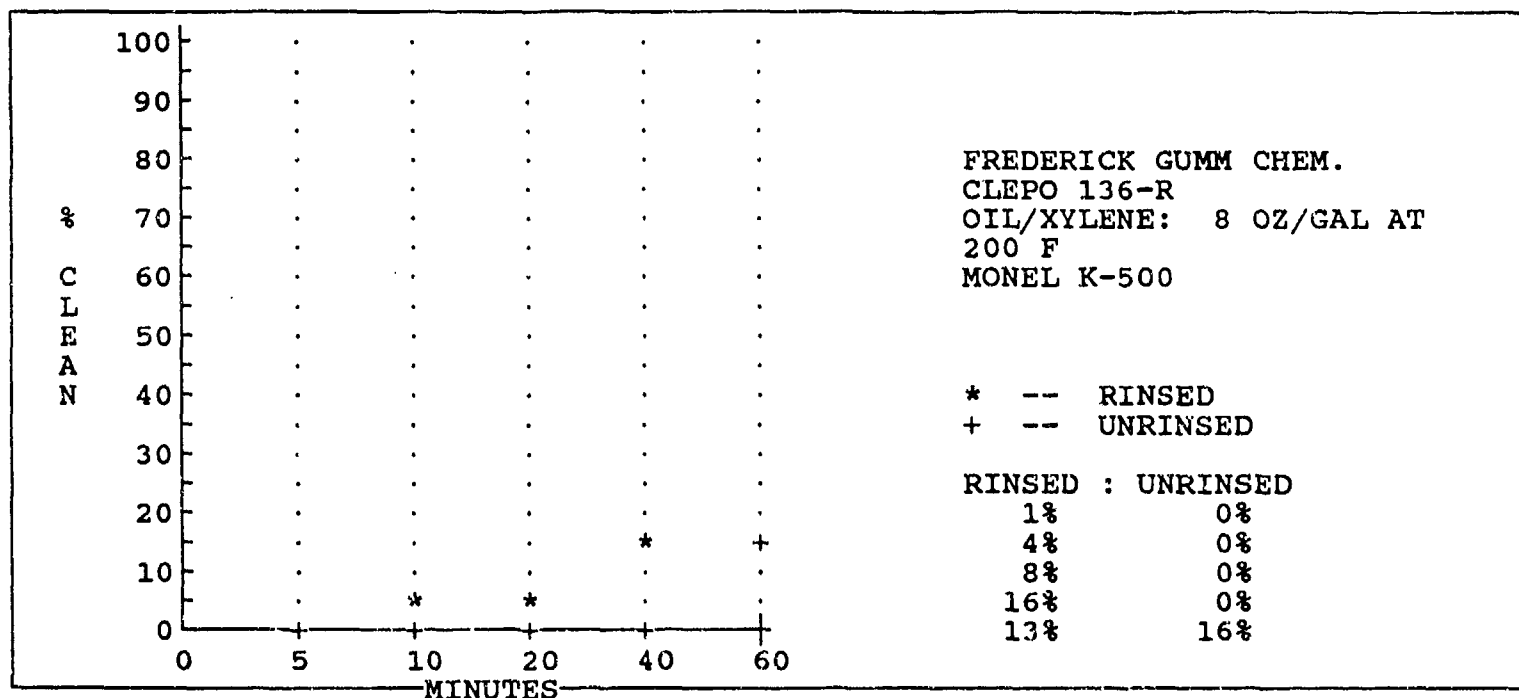


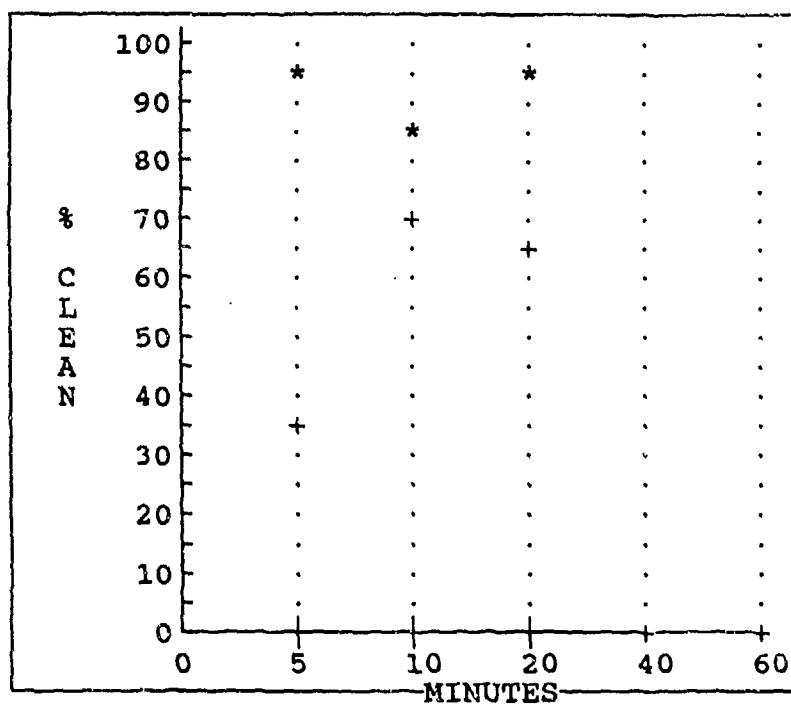










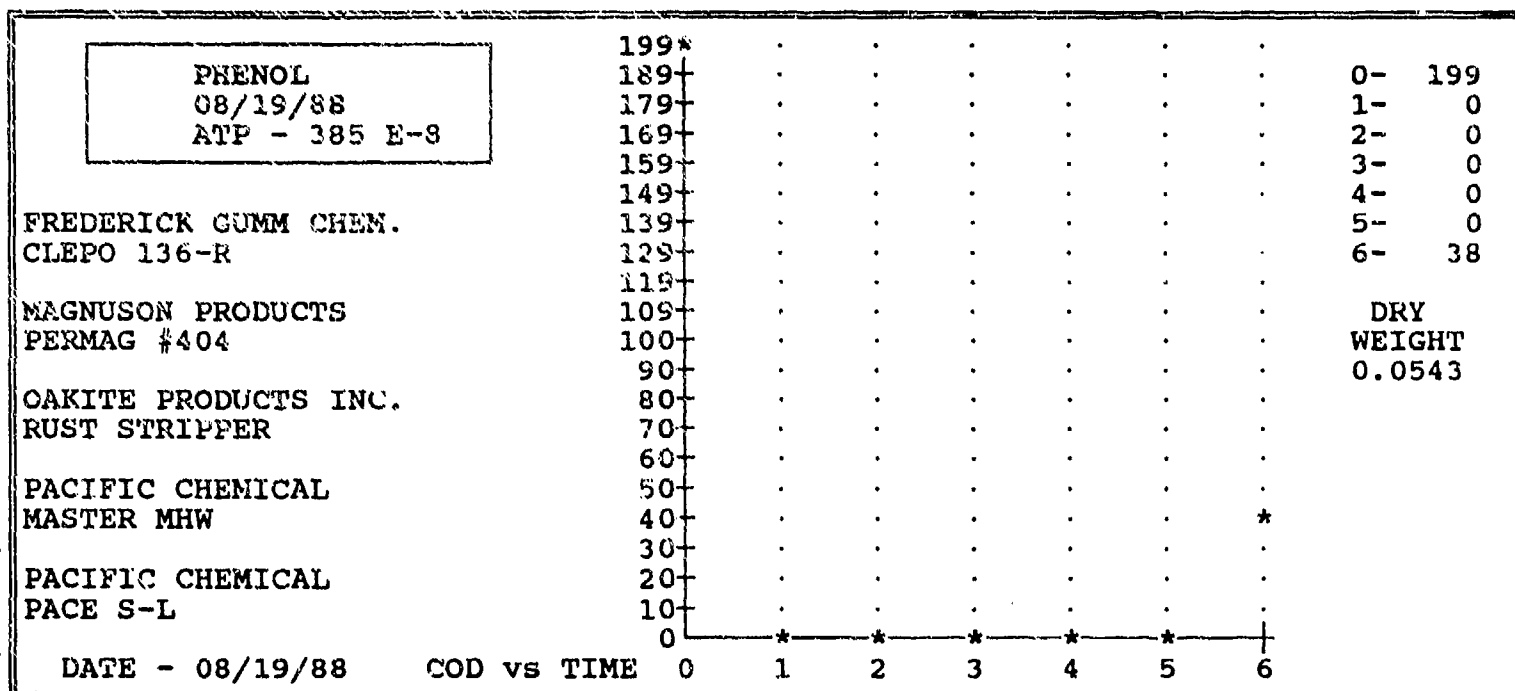
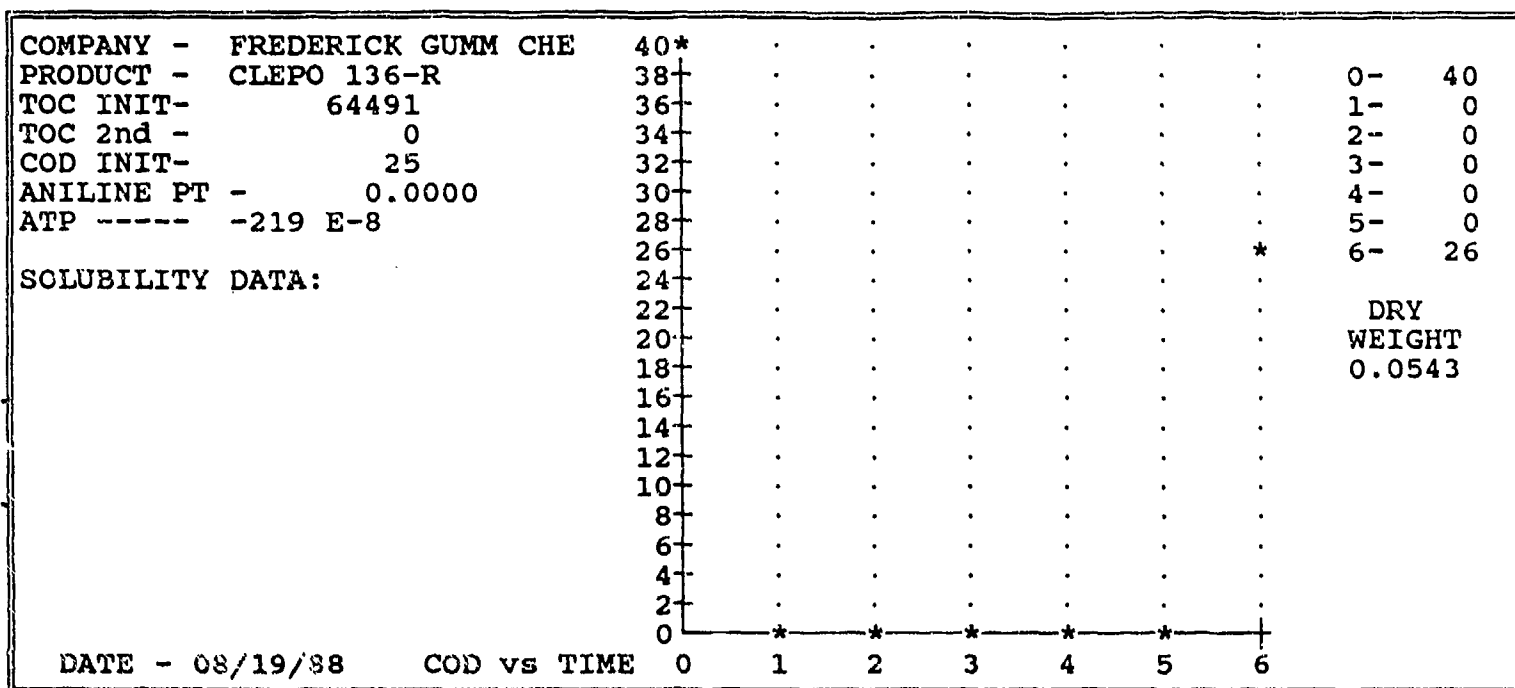


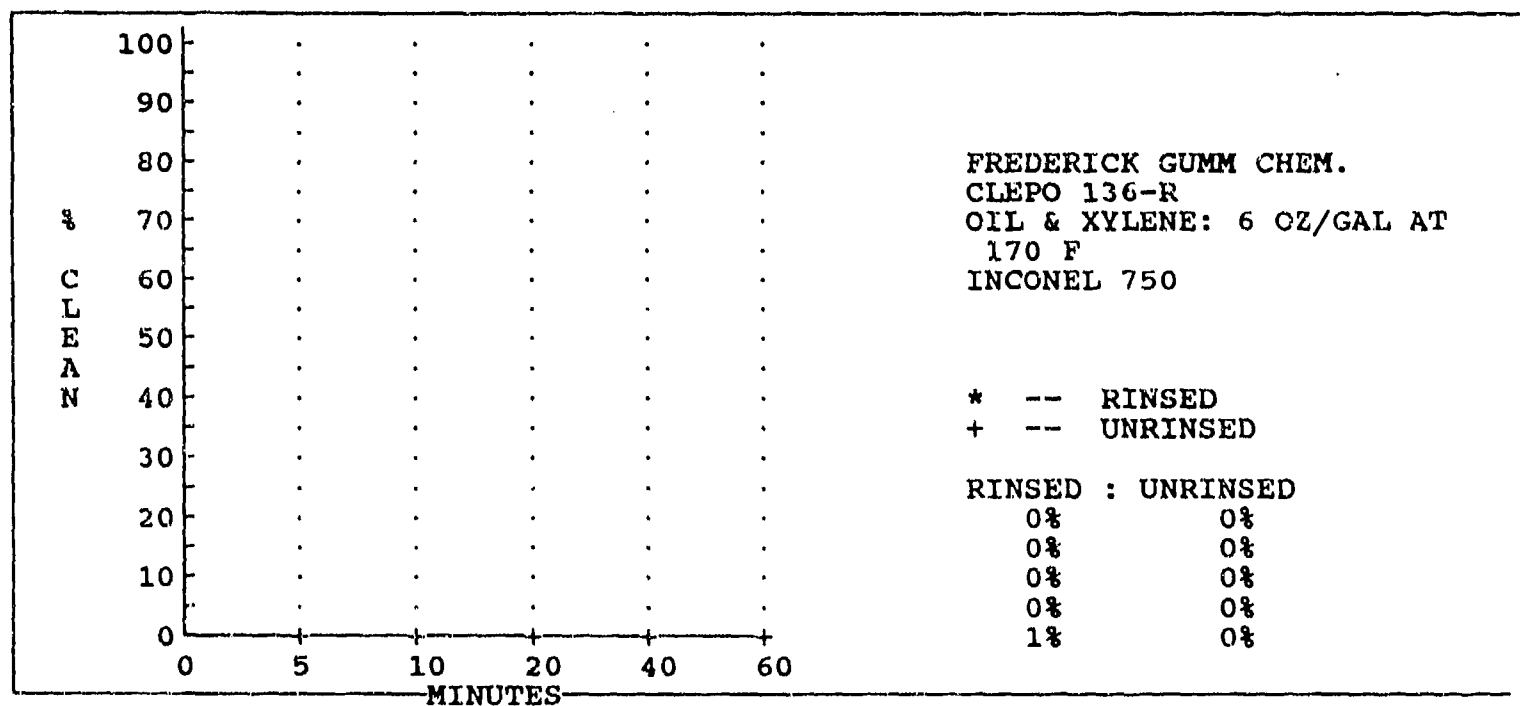
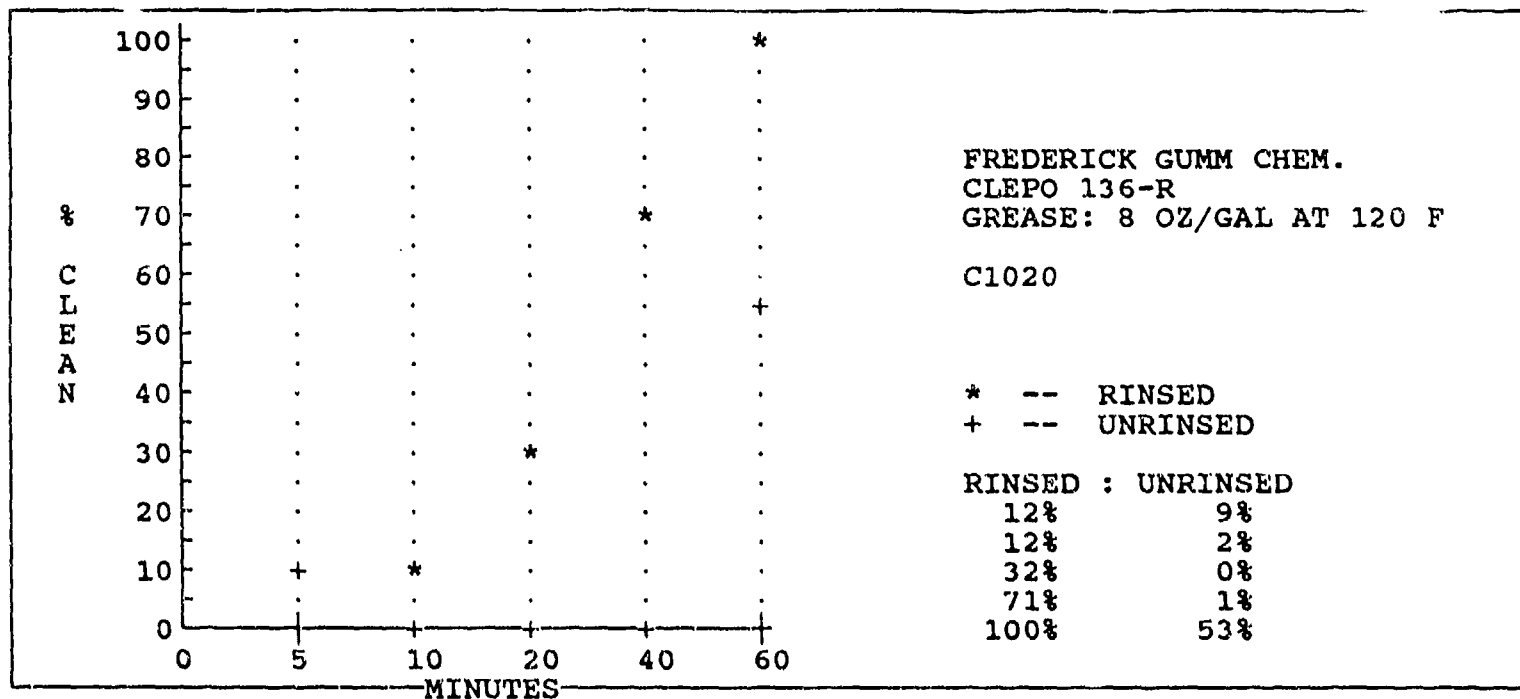
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 CLEPO 136-R
 HYDRAULIC FLUID: 8 OZ/GA
 L AT 200 F
 A17075

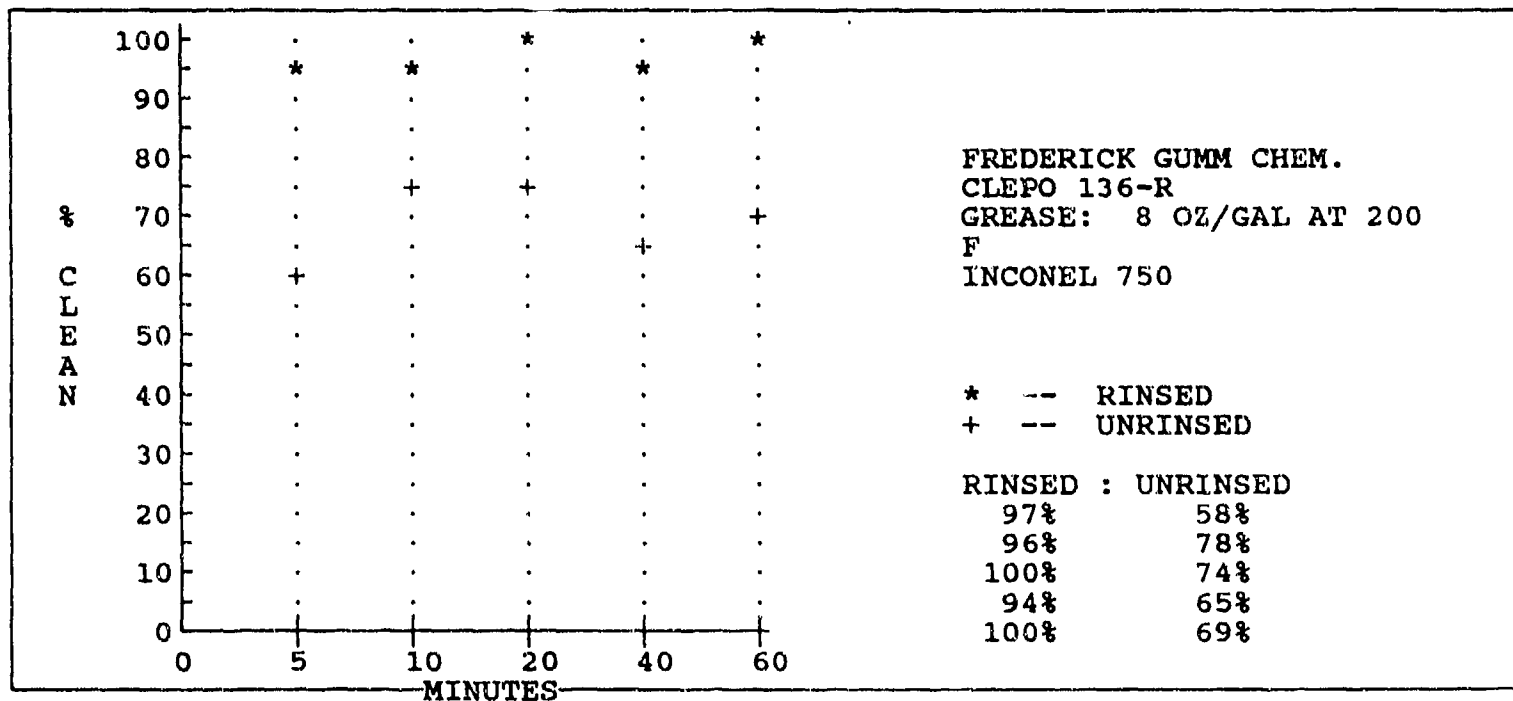
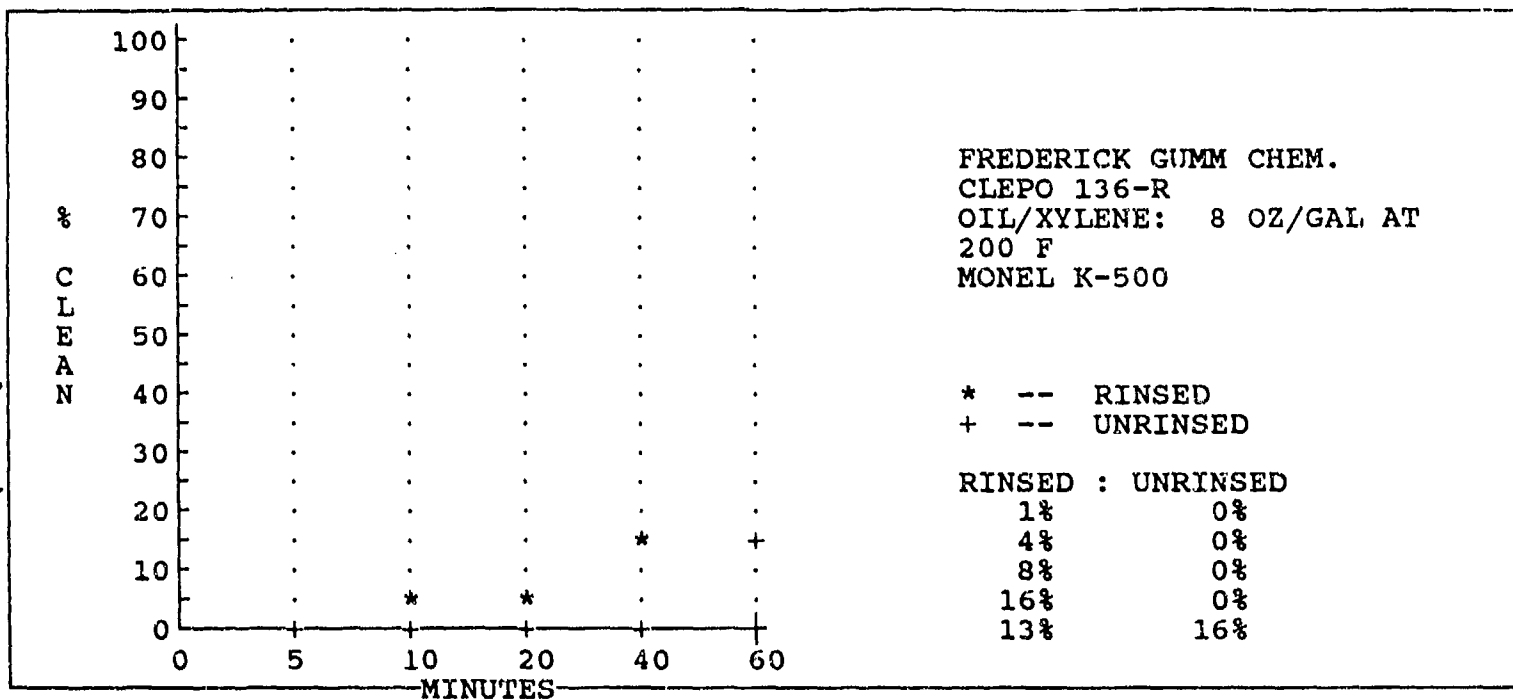
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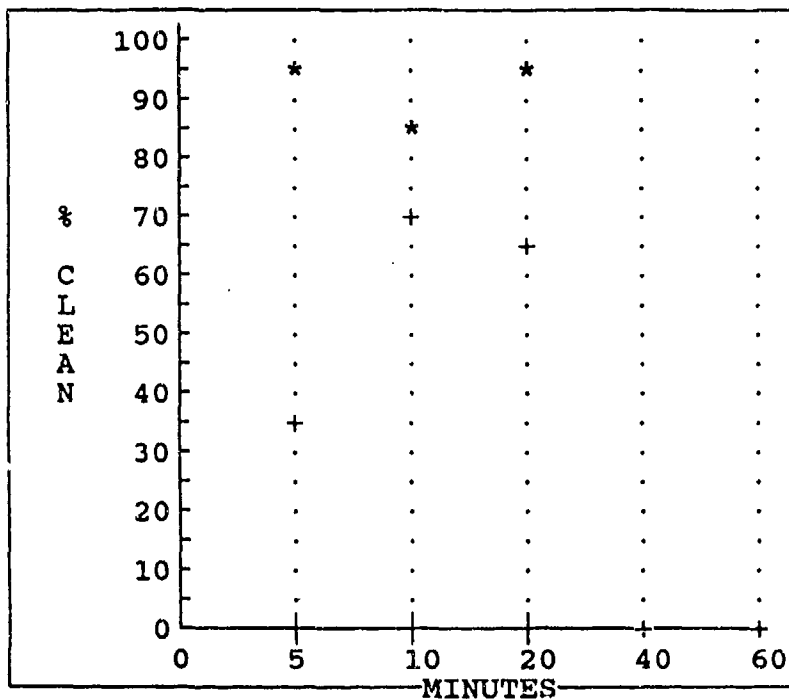
RINSED : UNRINSED

95%	36%
88%	68%
97%	67%
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0%	0%





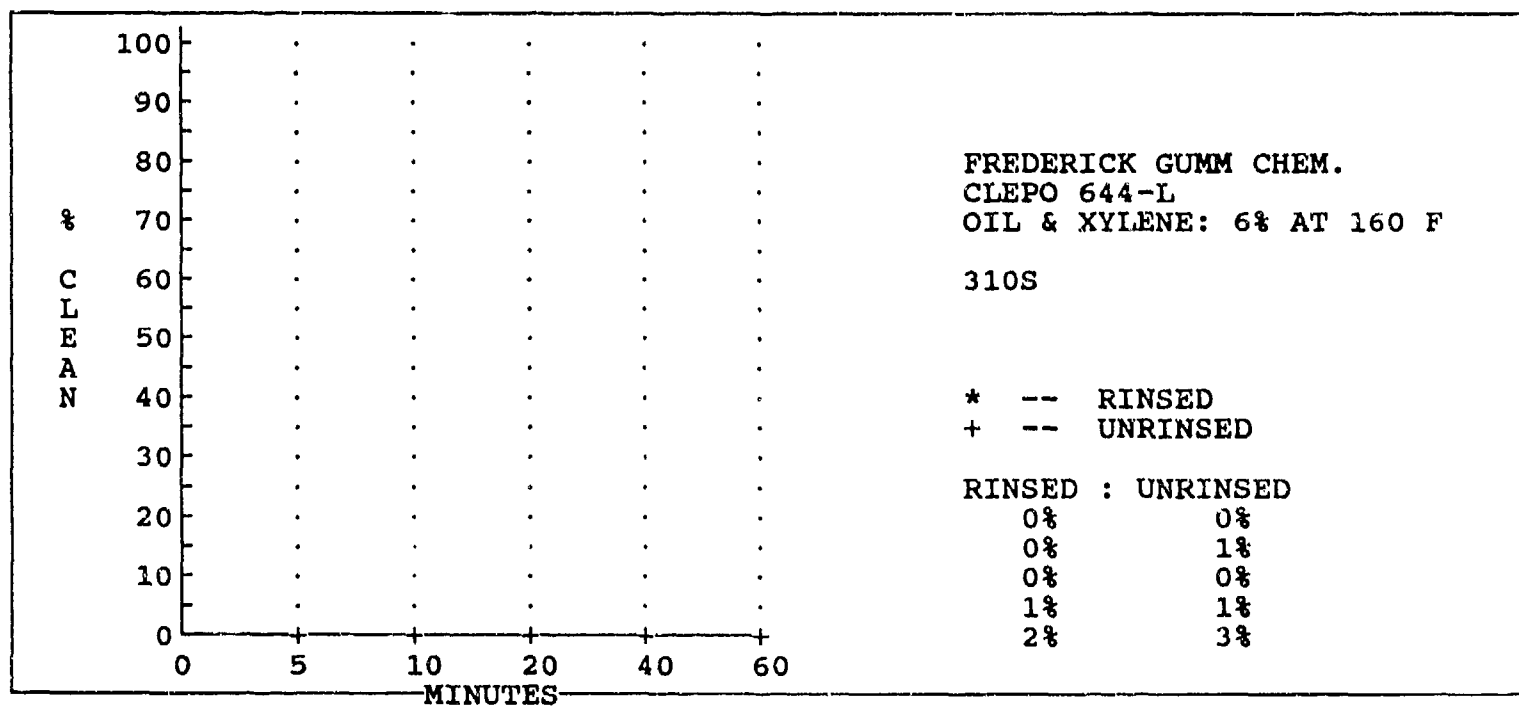
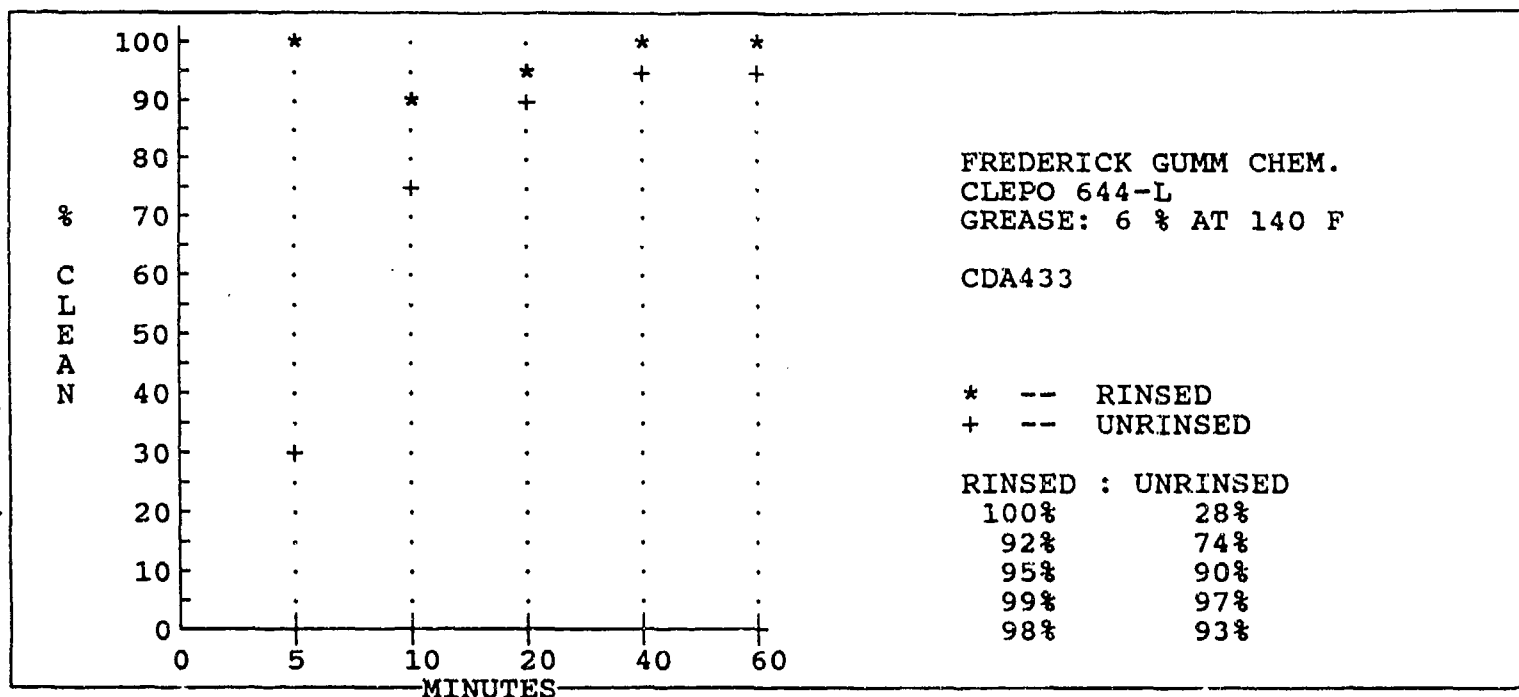


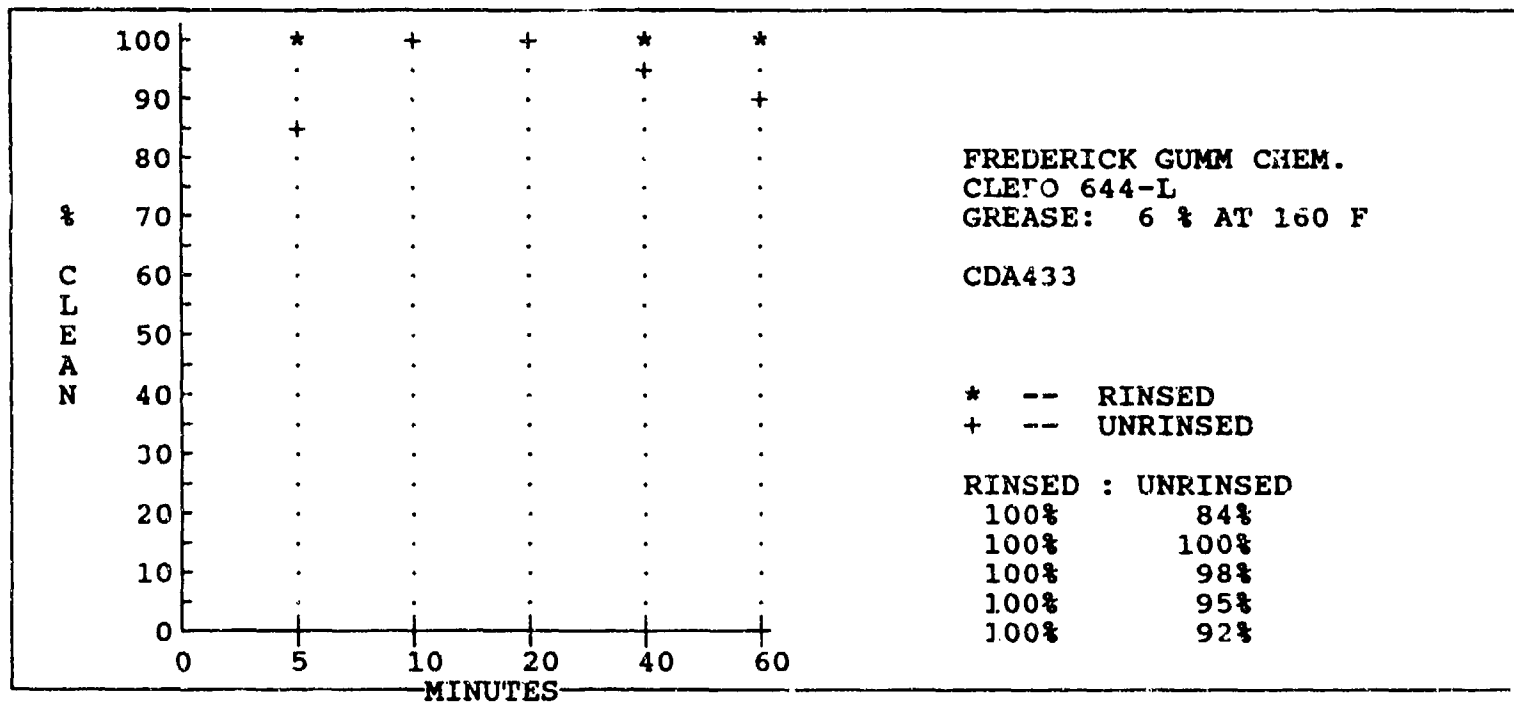
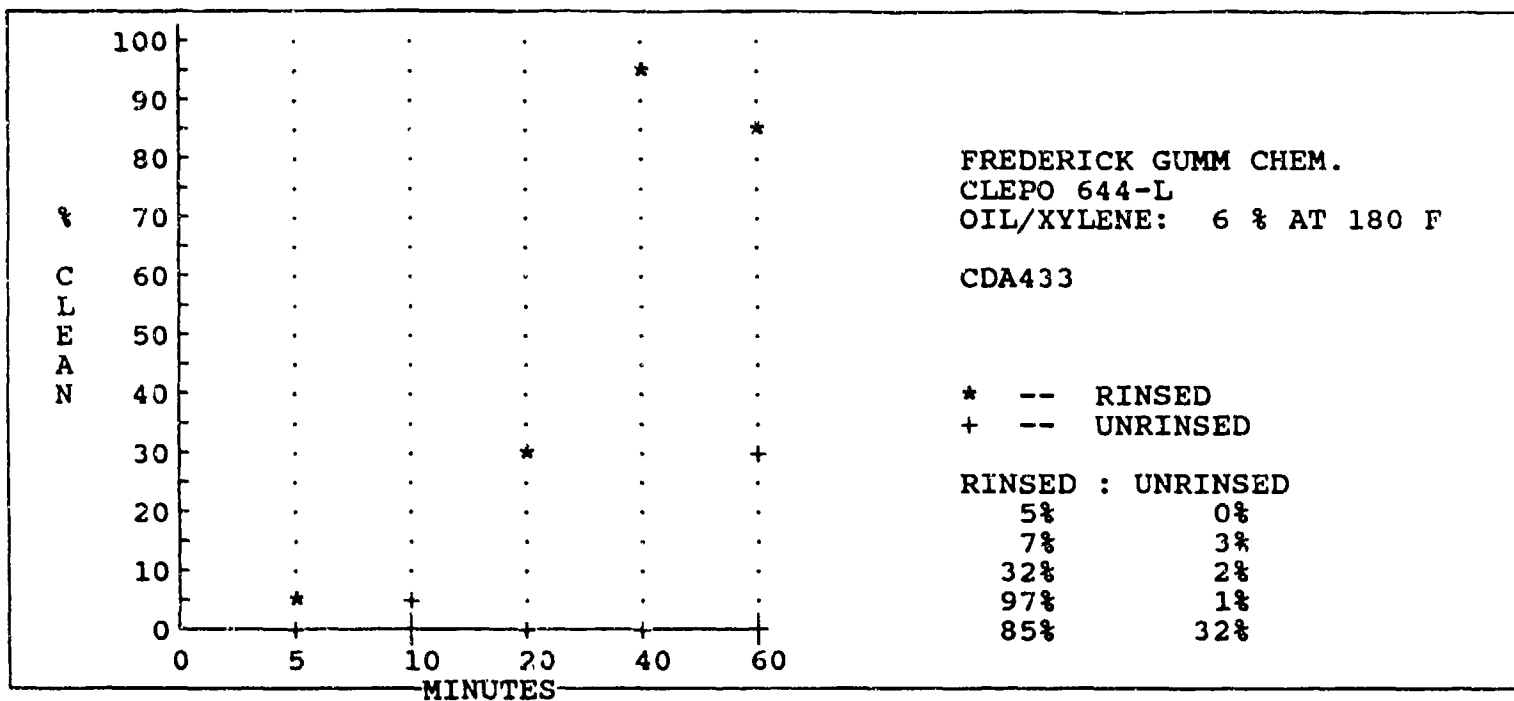


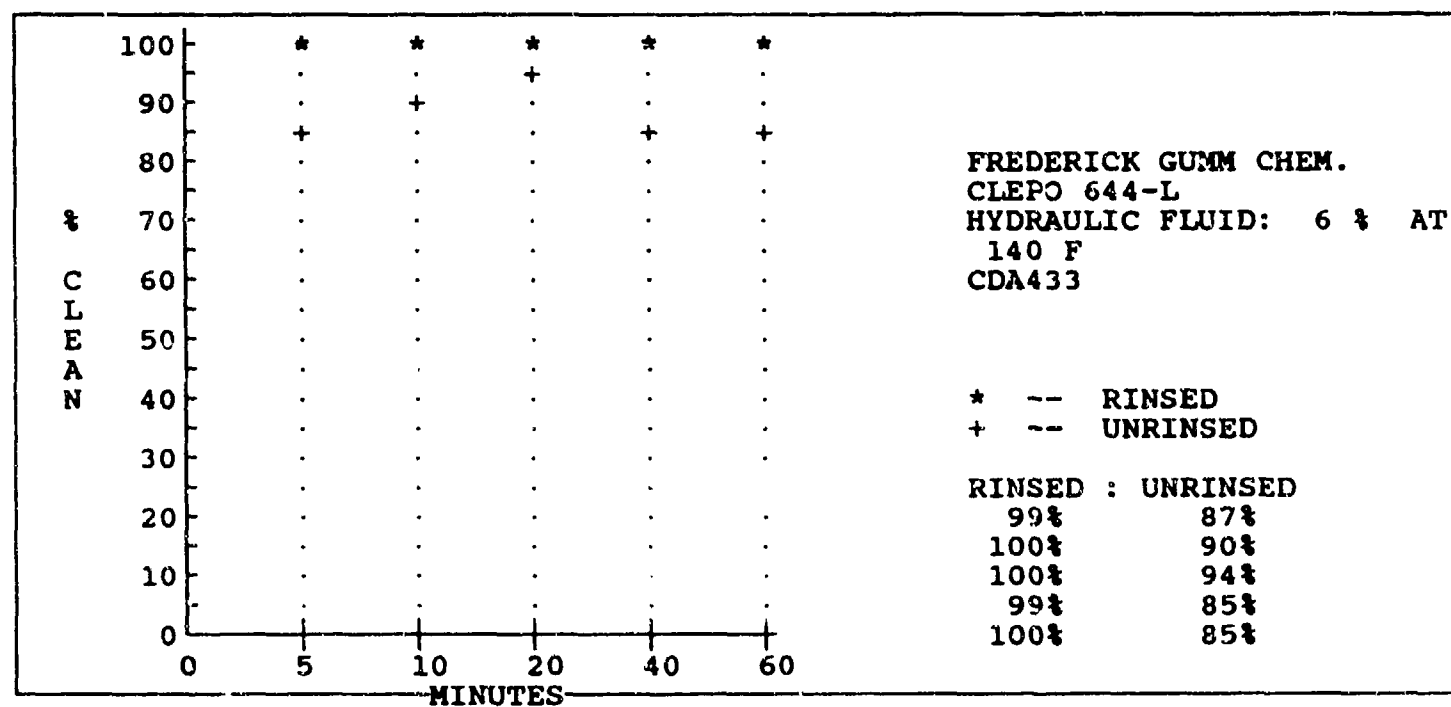
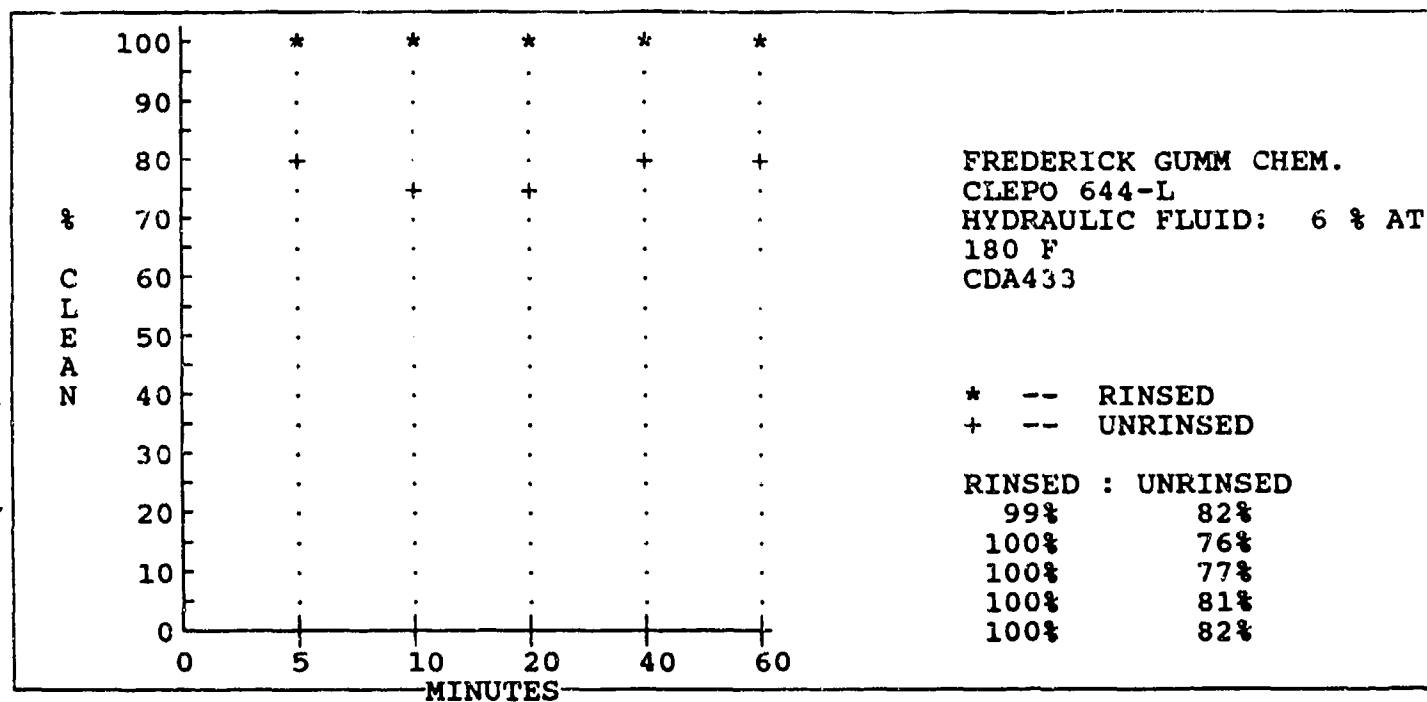
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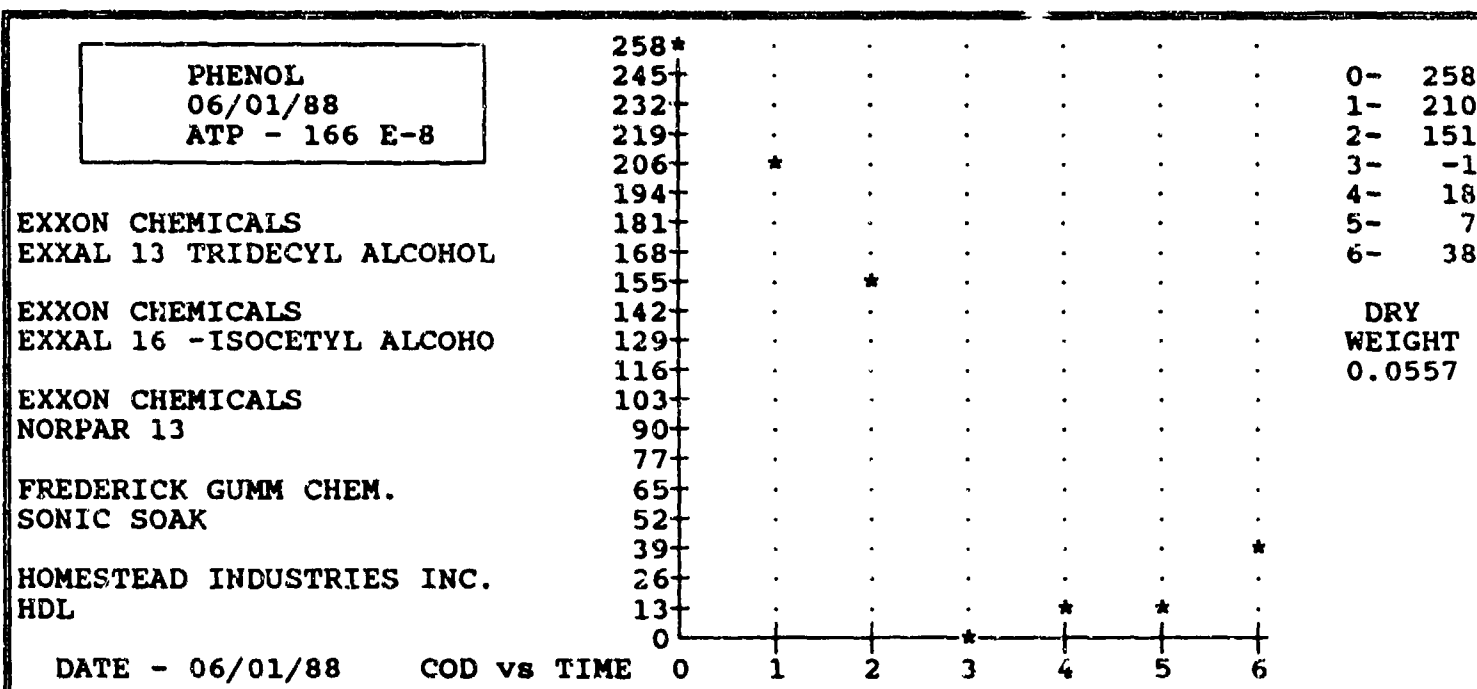
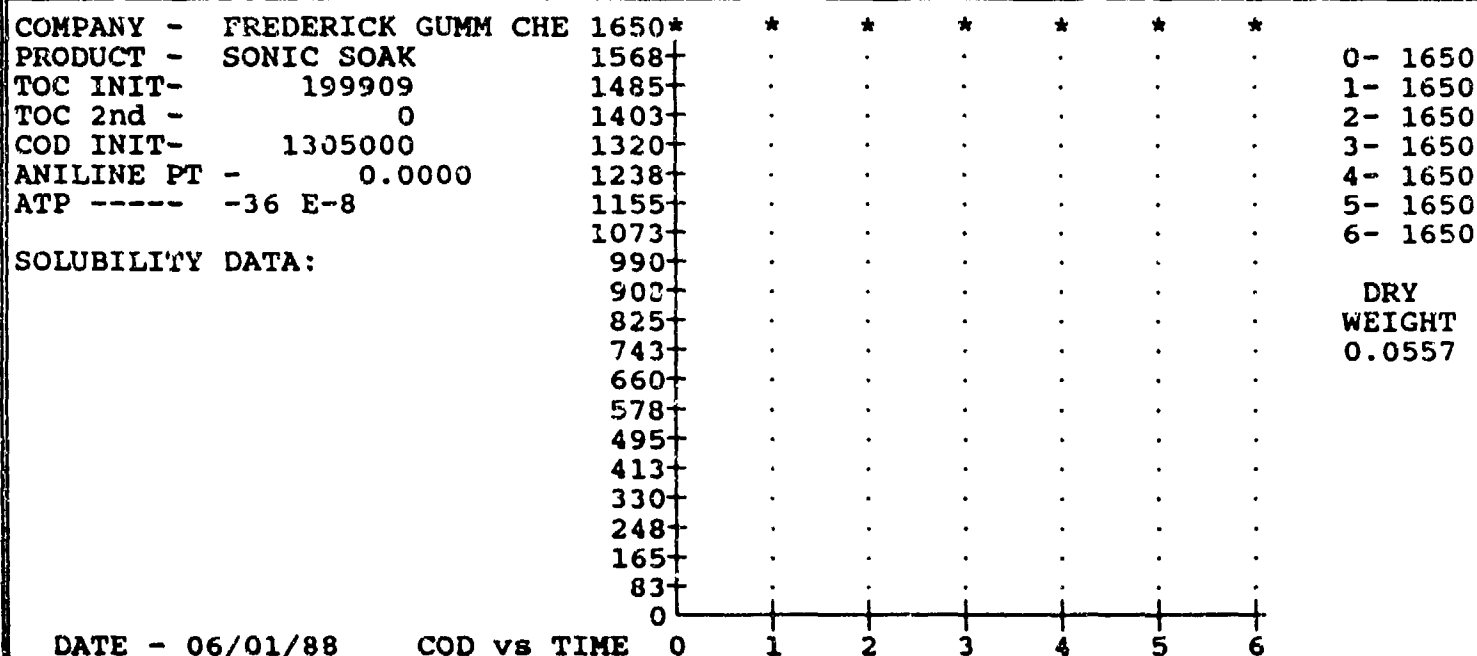
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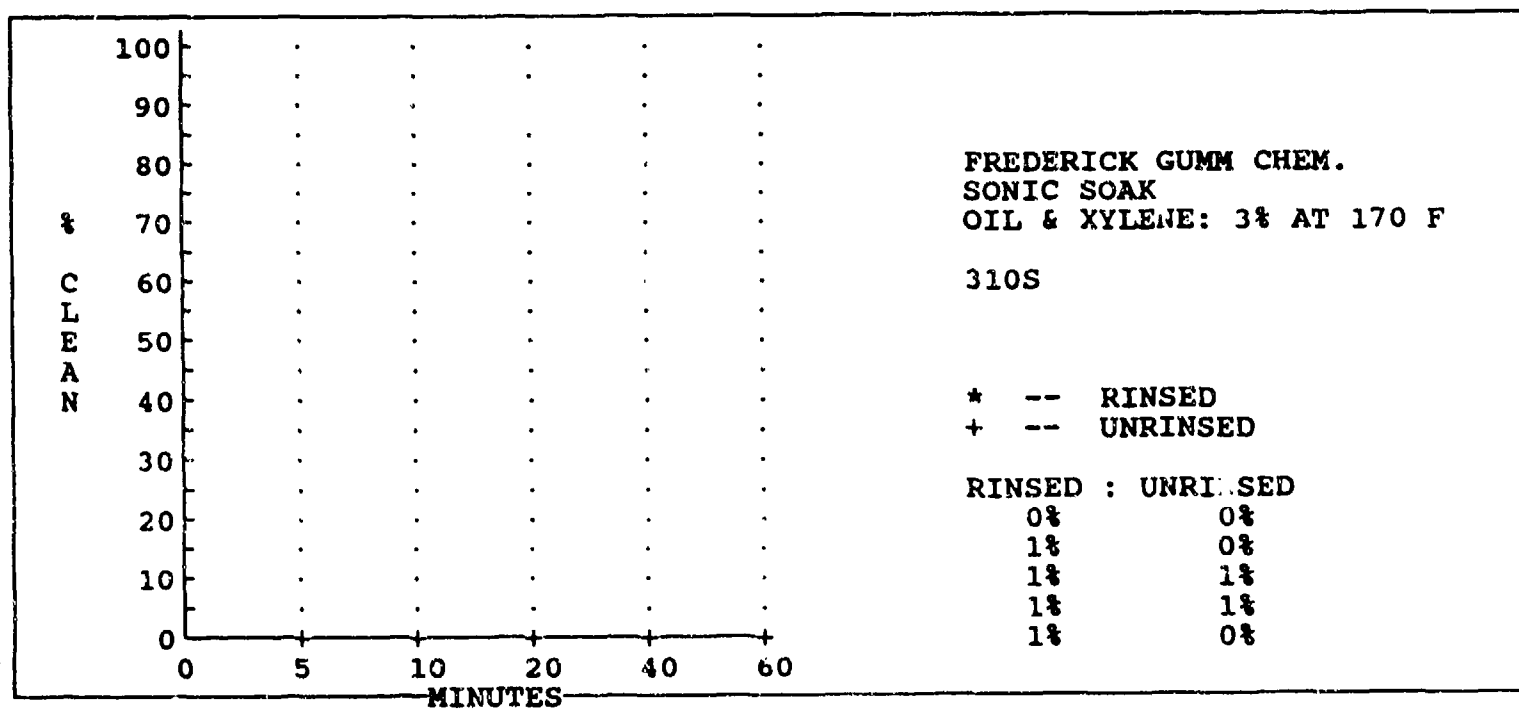
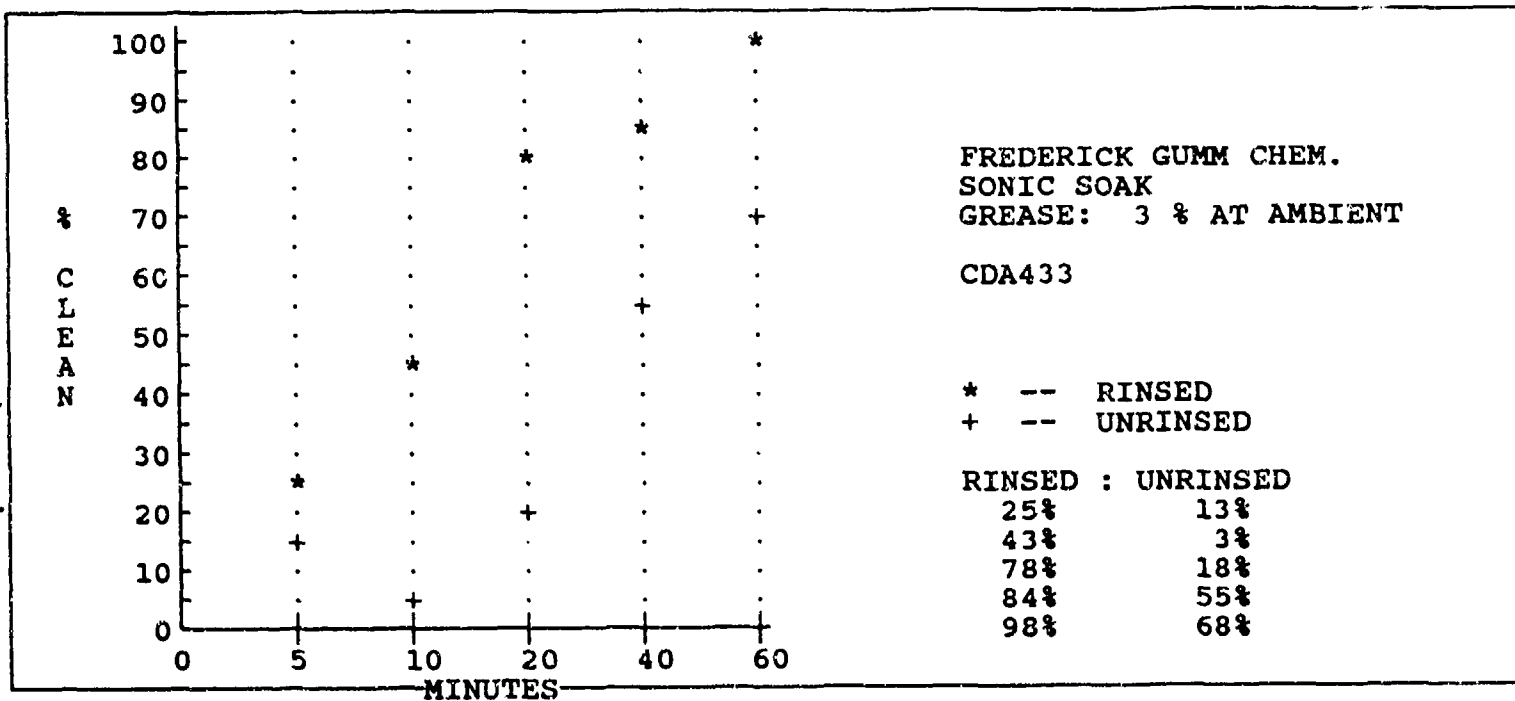
RINSED : UNRINSED
 95% 36%
 88% 68%
 97% 67%
 0% 0%
 0% 0%

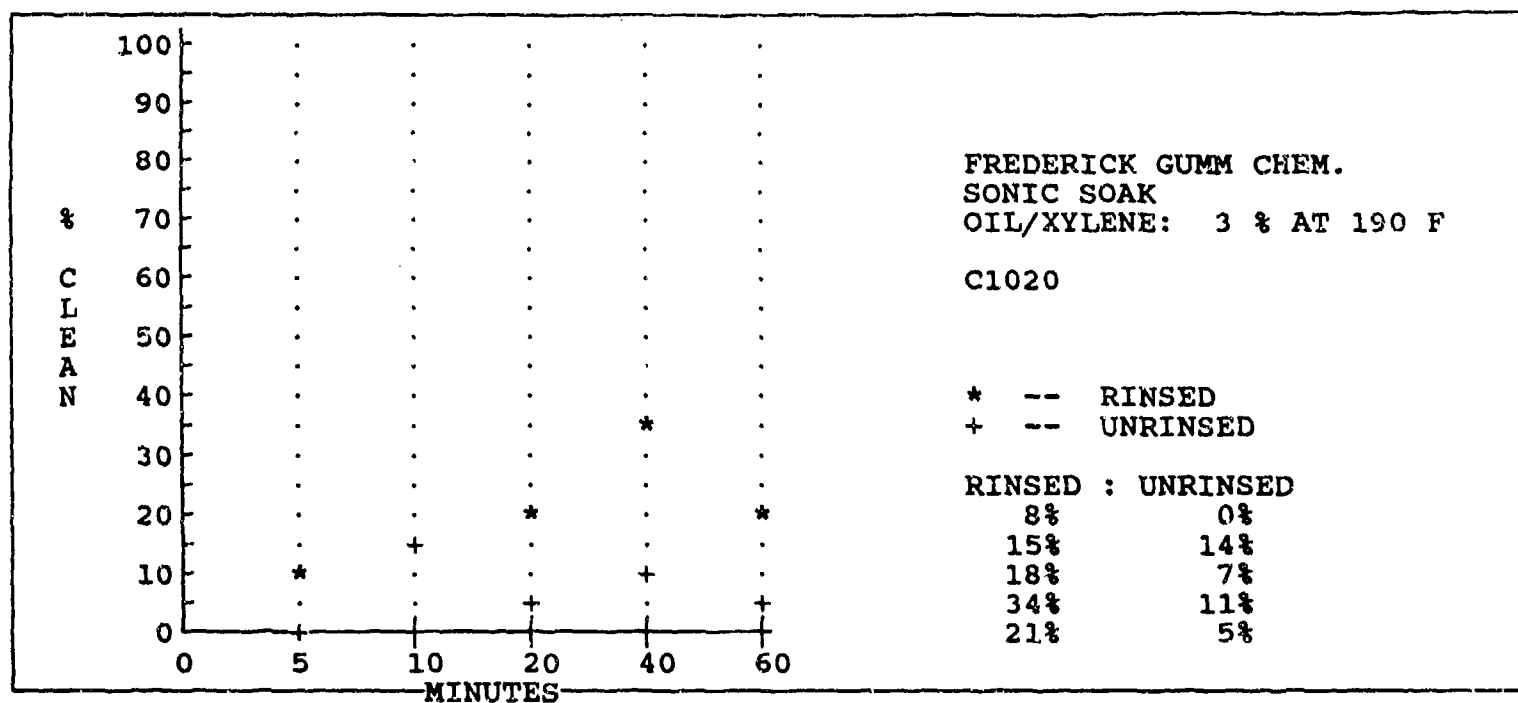


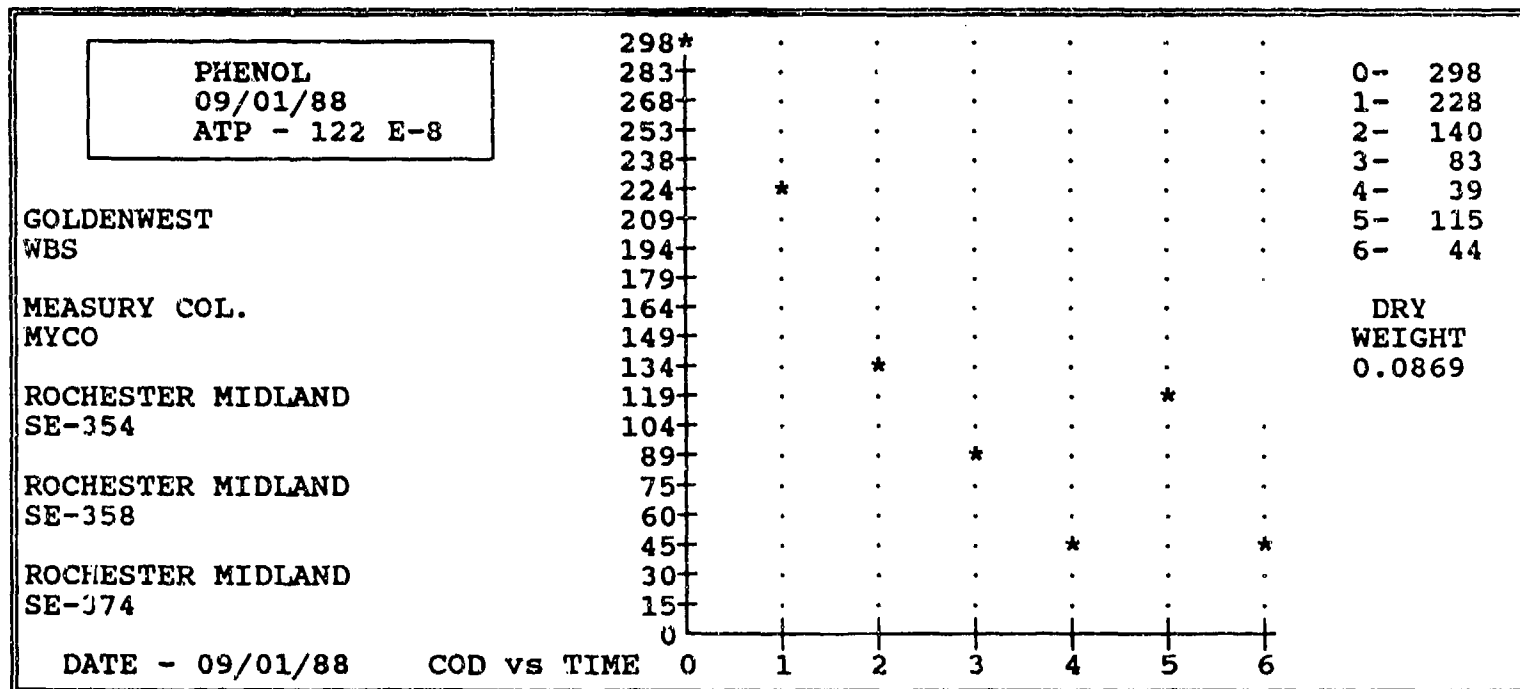
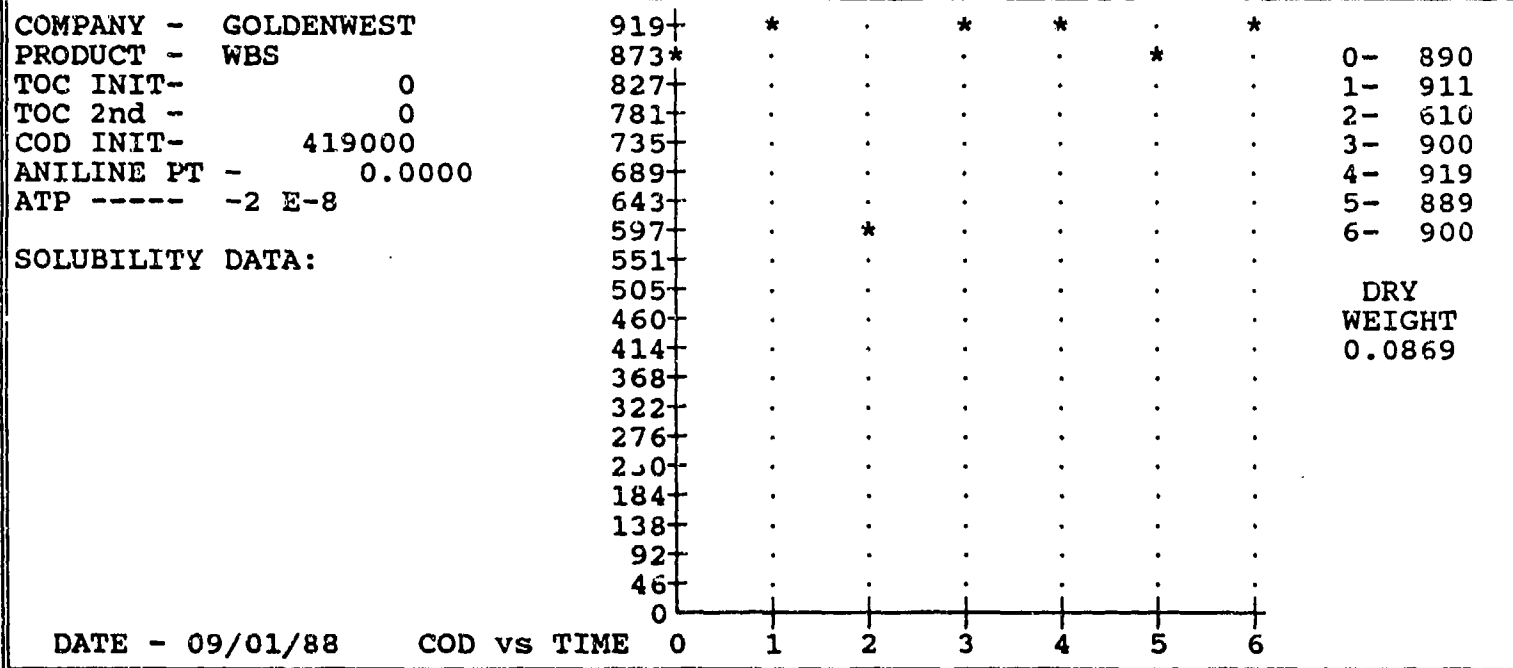


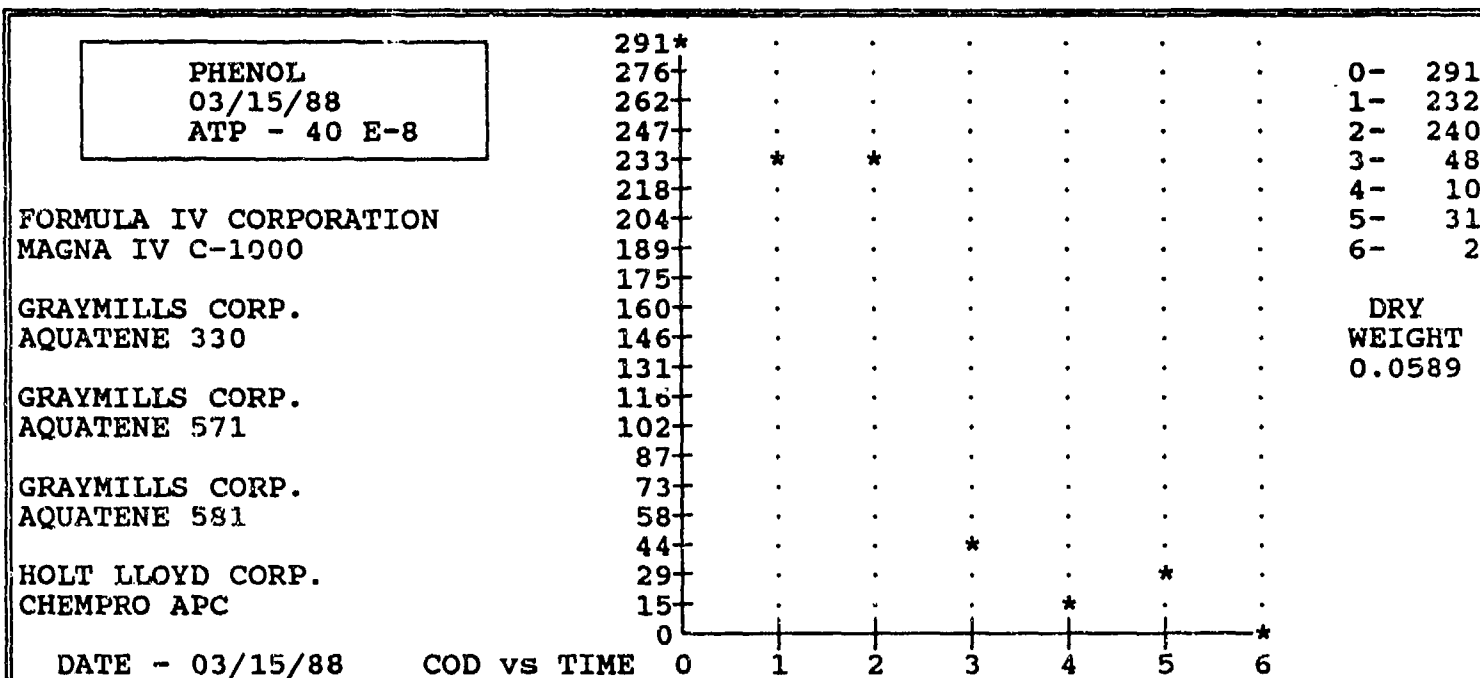
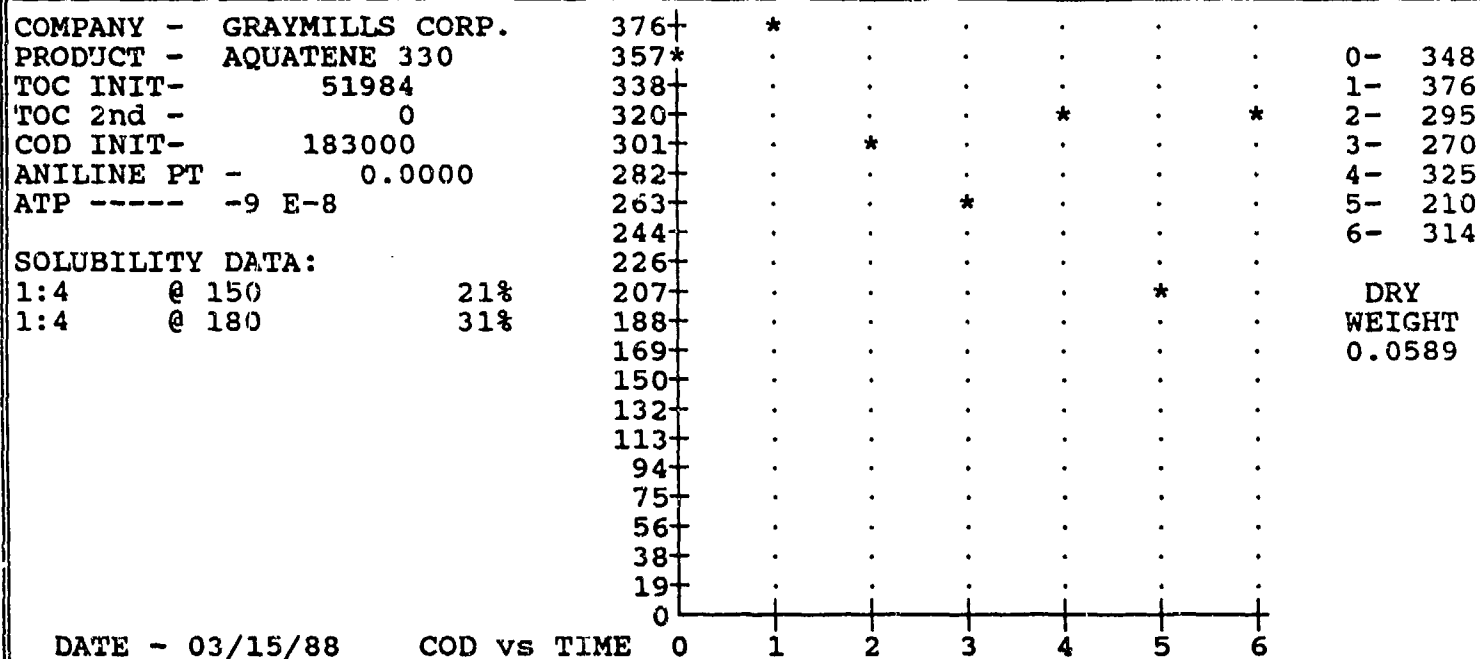


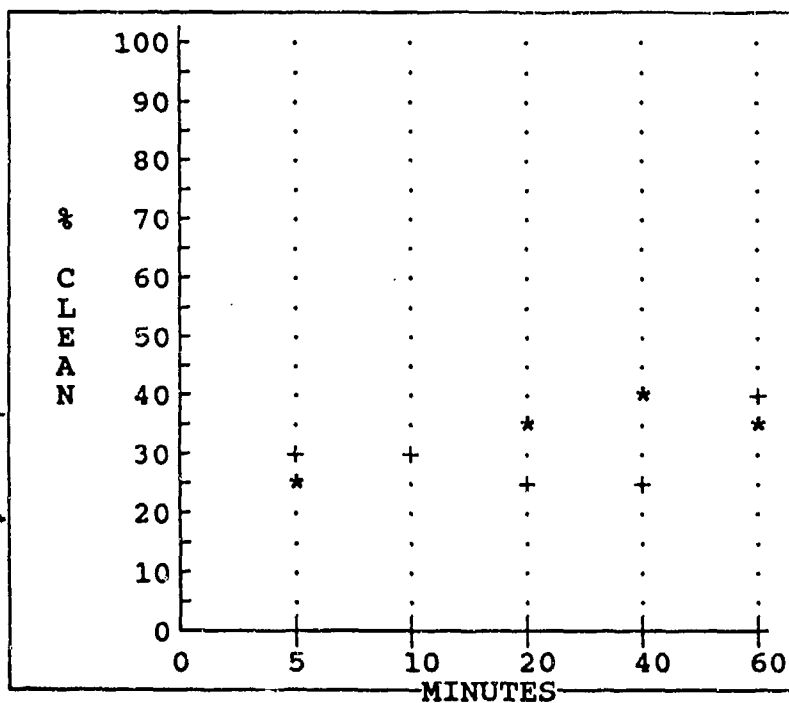










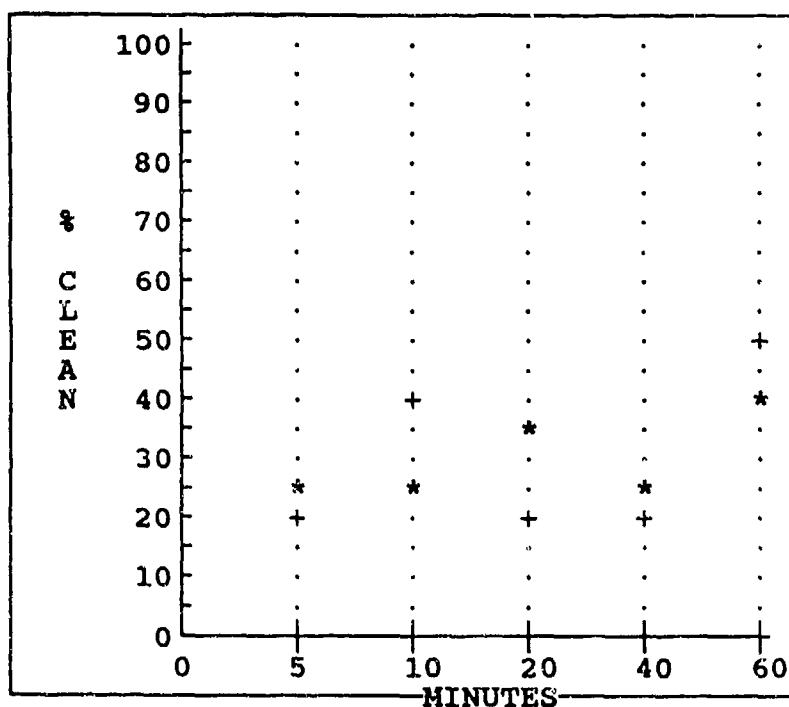


GRAYMILLS CORP.
AQUATENE 330
1:4 AT 150 F

A12024

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED
26% 28%
31% 29%
35% 24%
40% 26%
36% 39%

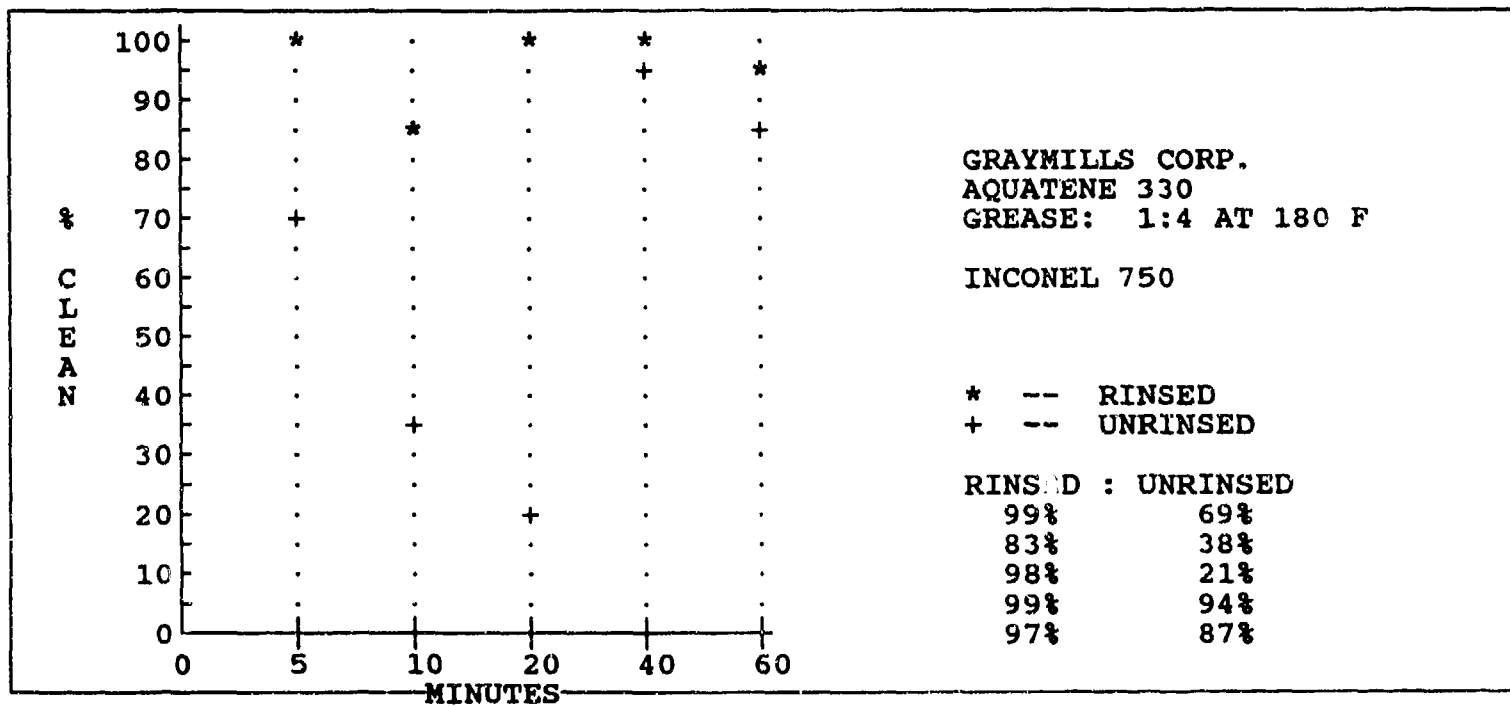
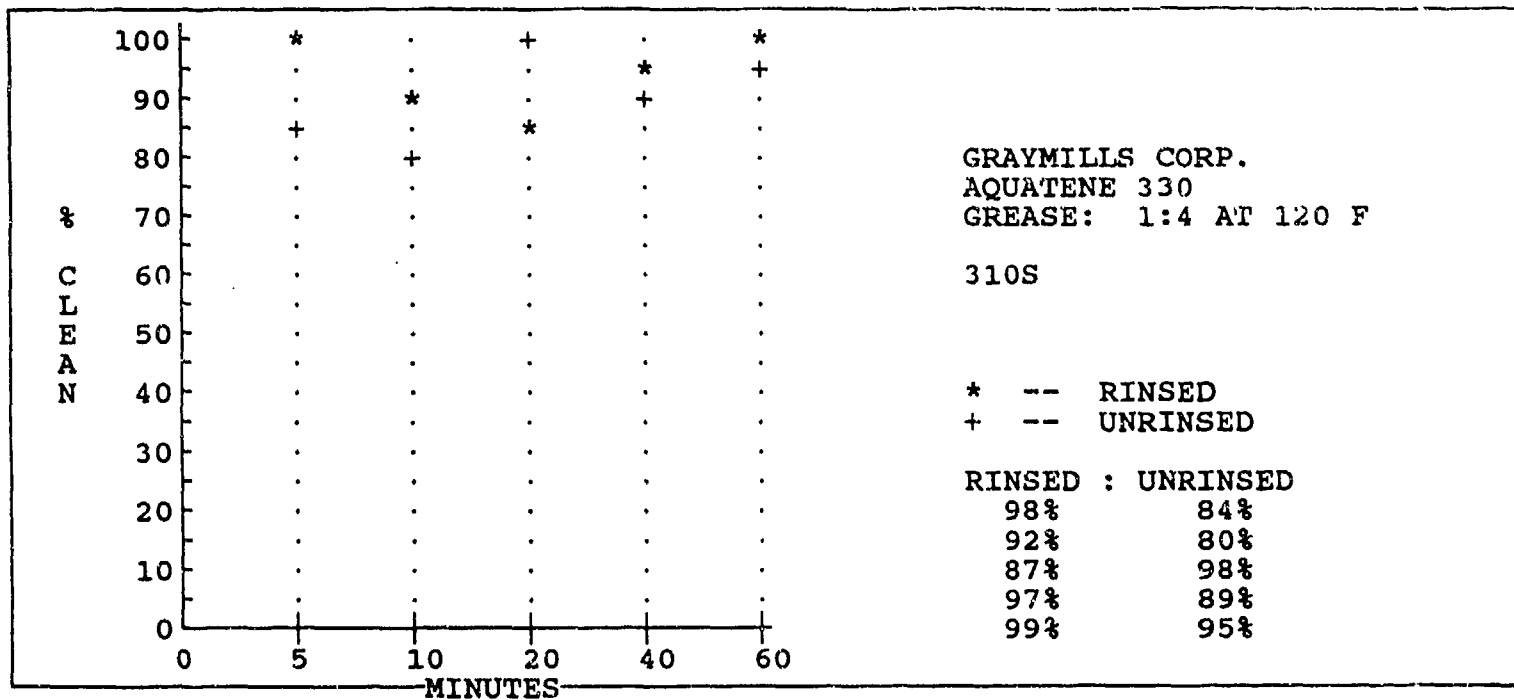


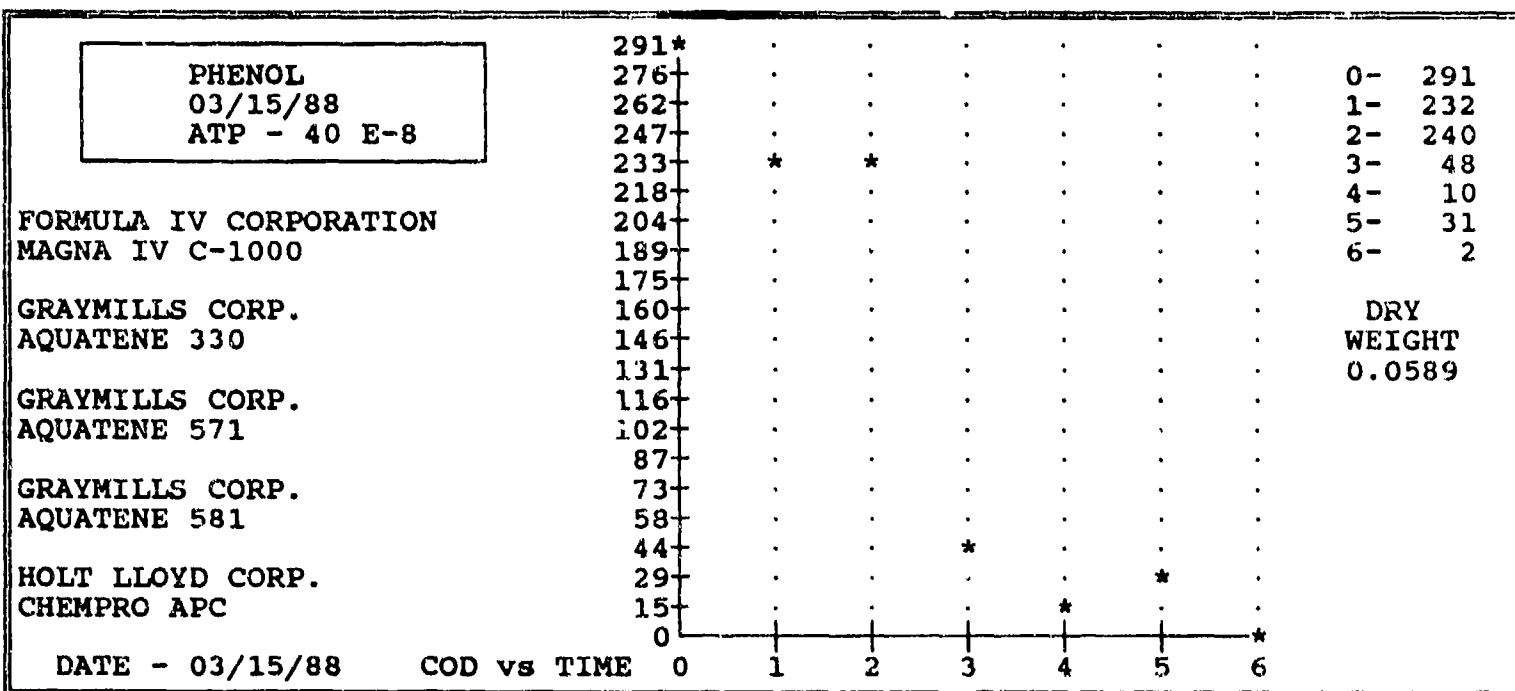
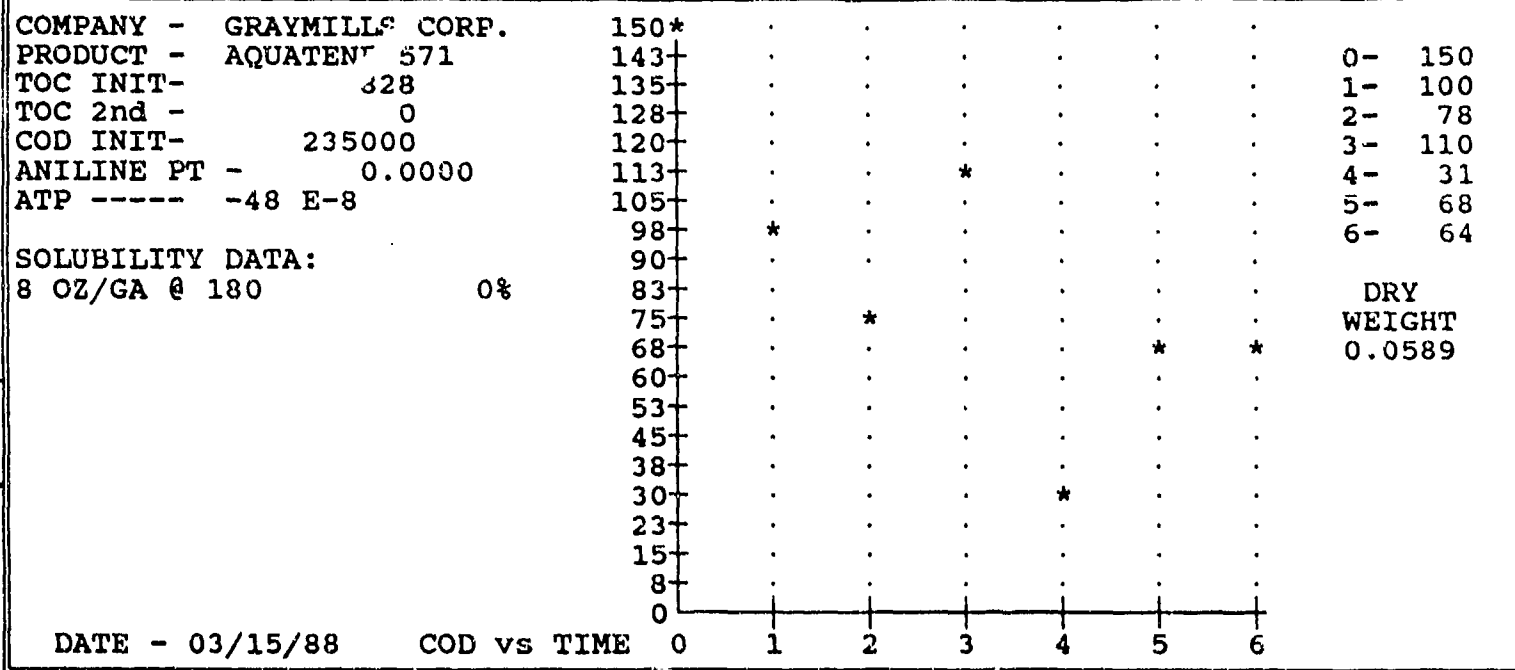
GRAYMILLS CORP.
AQUATENE 330
1:4 @ 160 F

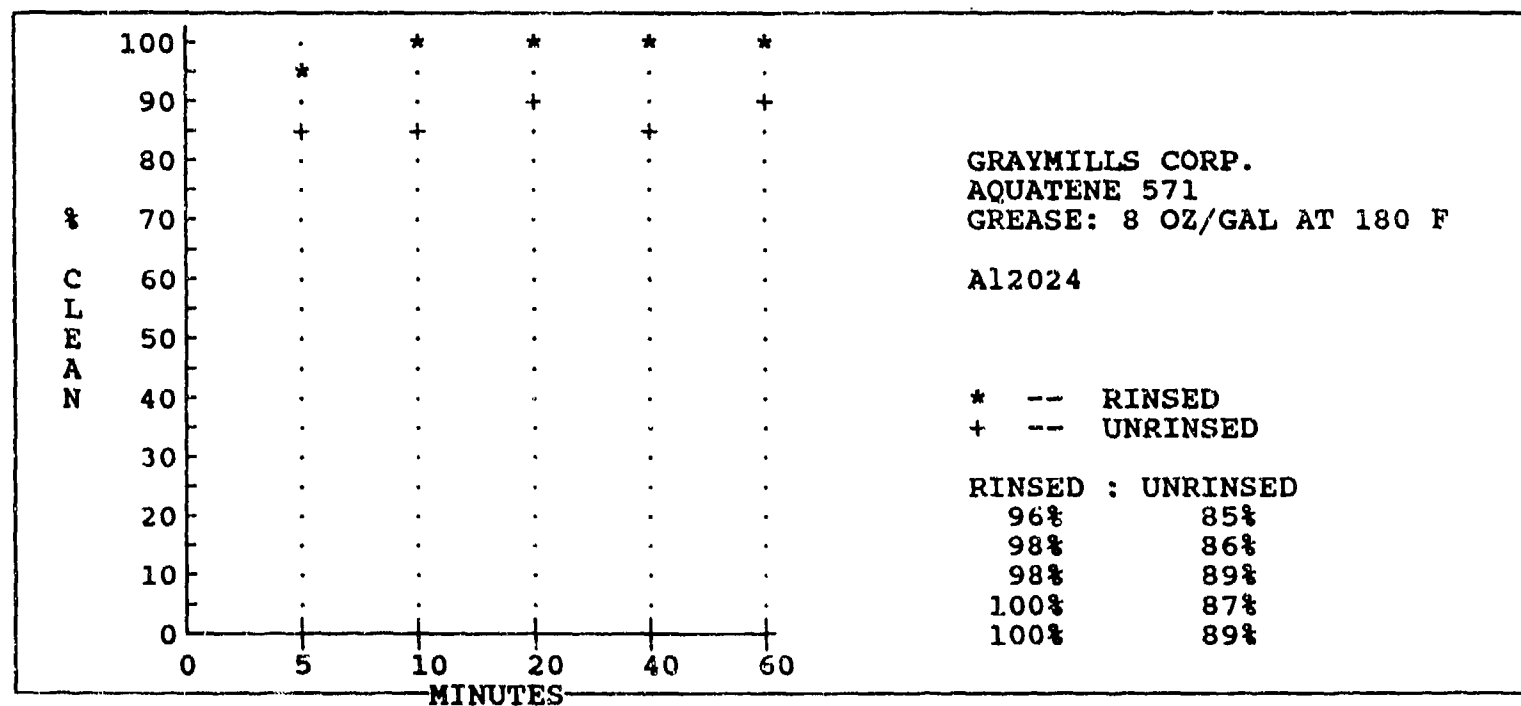
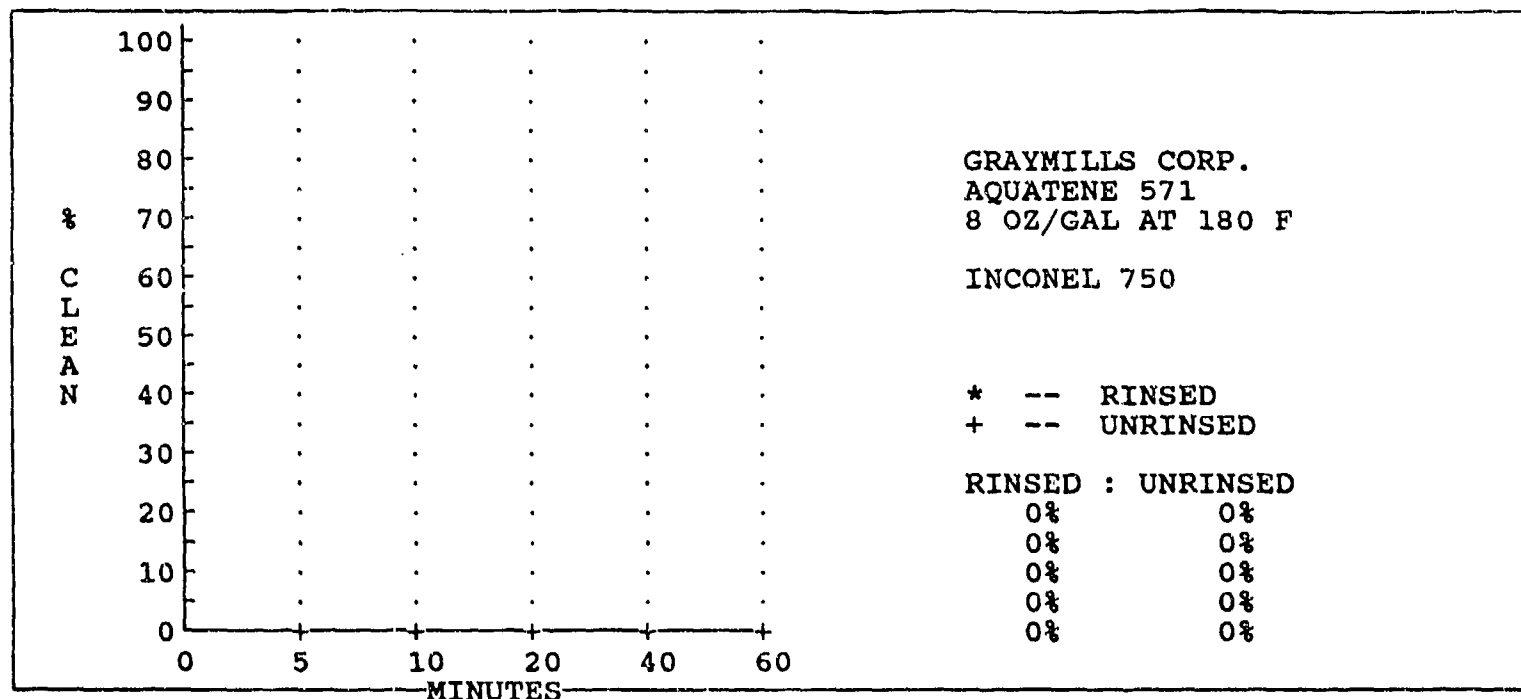
C1020

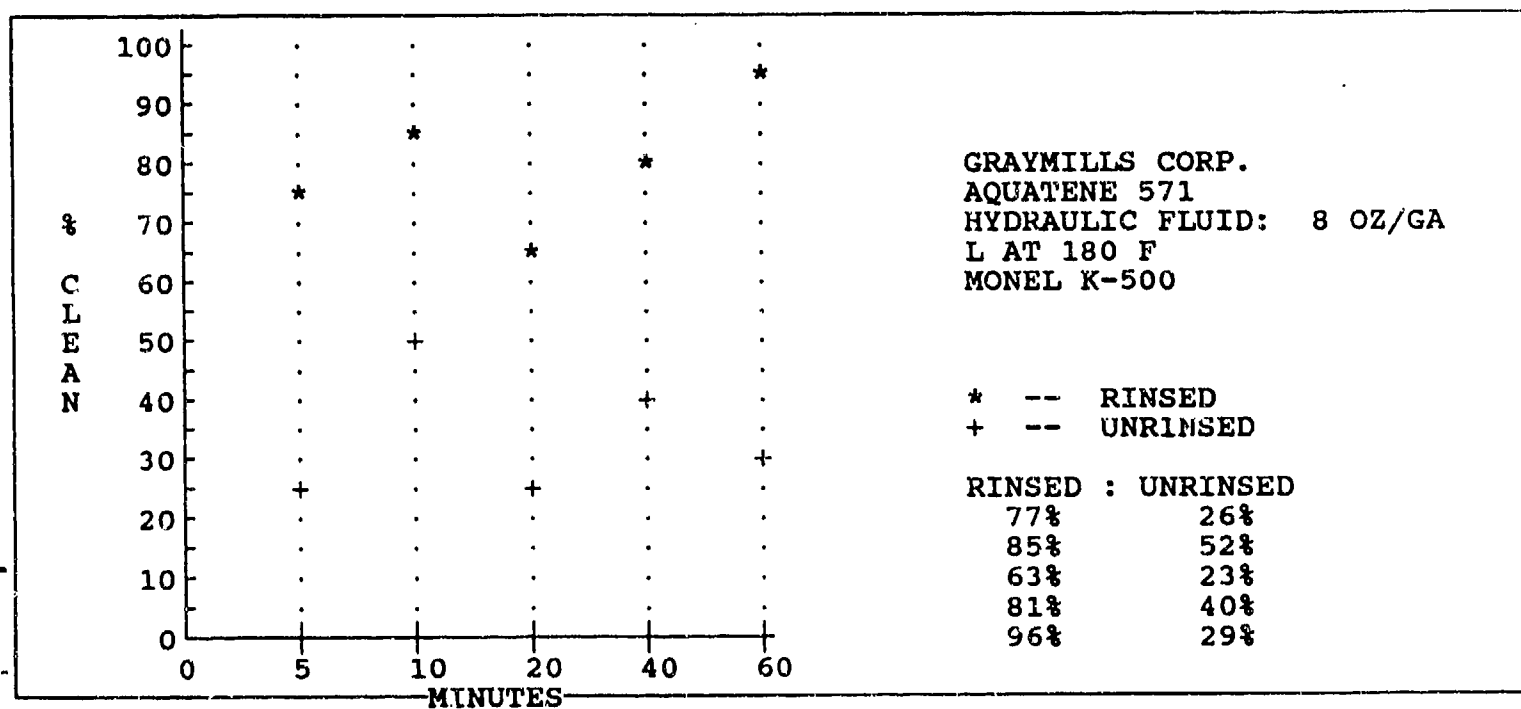
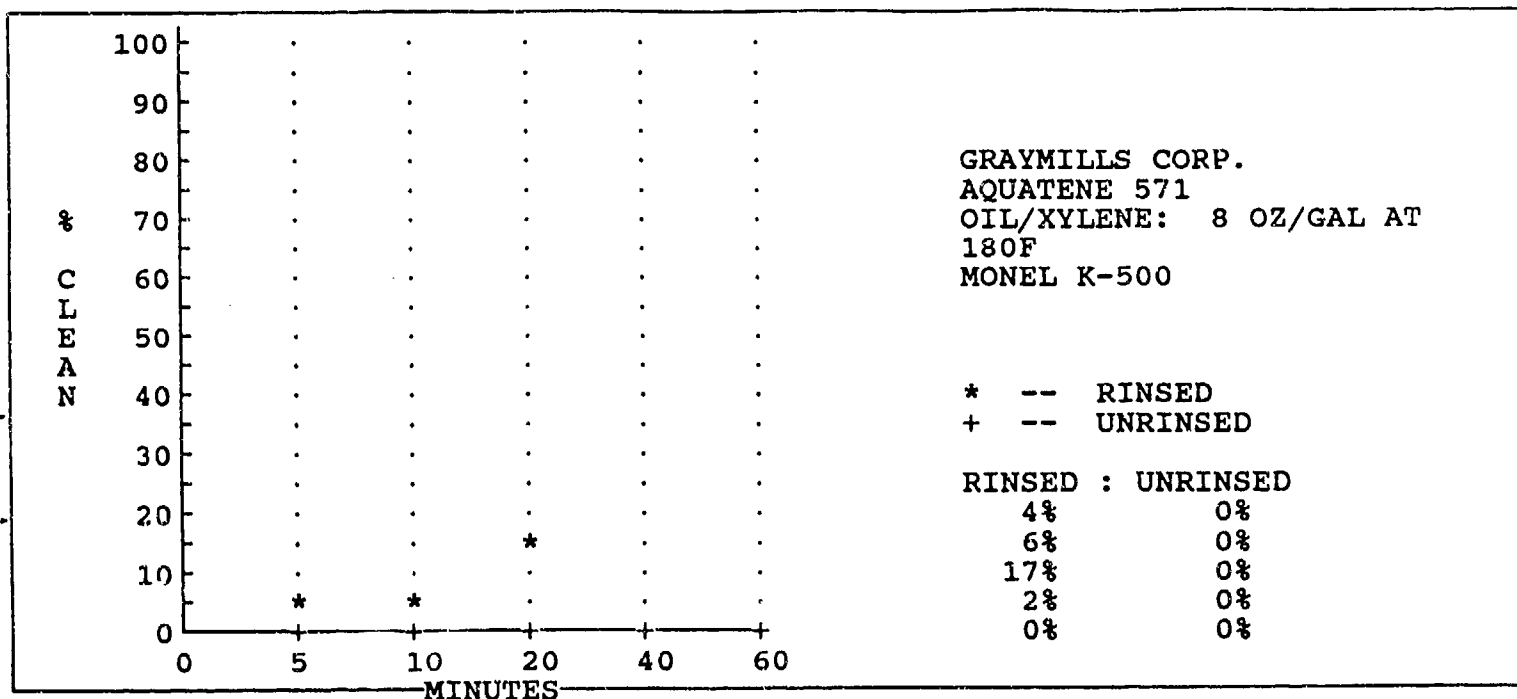
* -- RINSED
+ -- UNRINSED

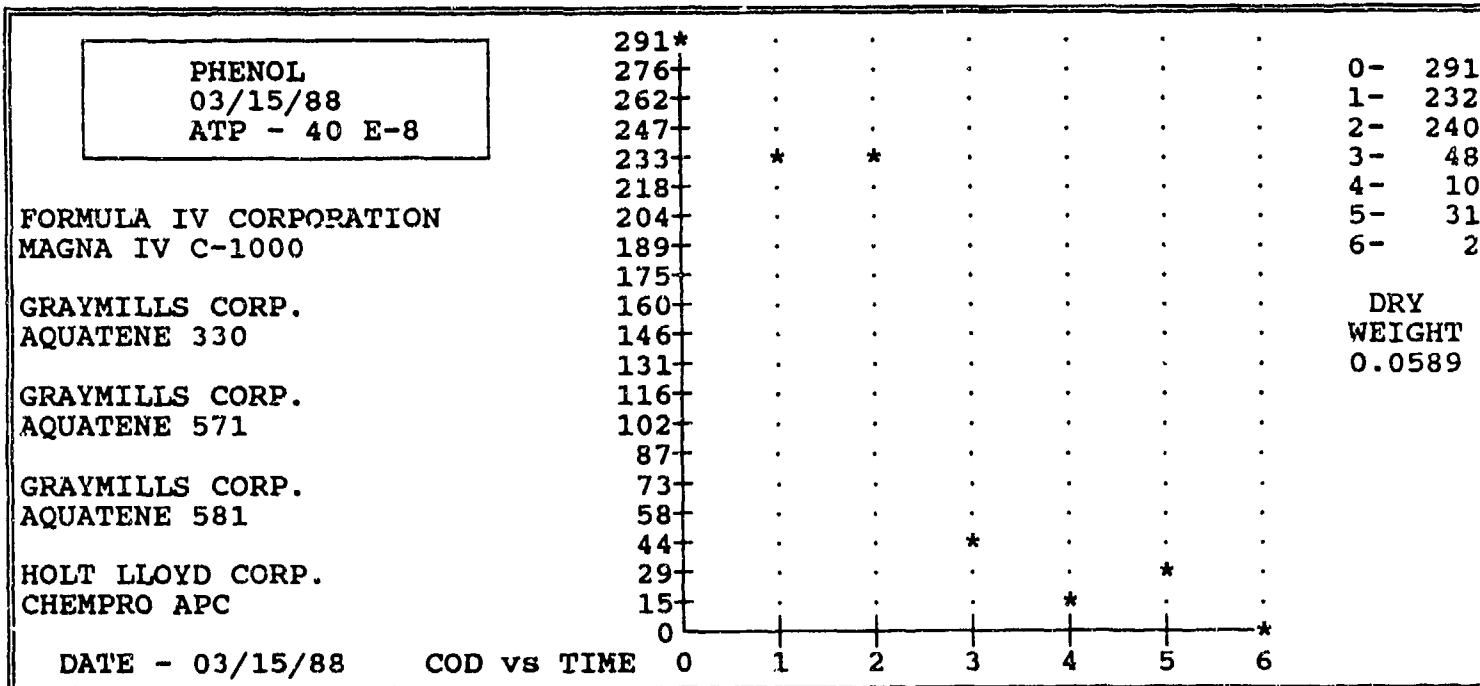
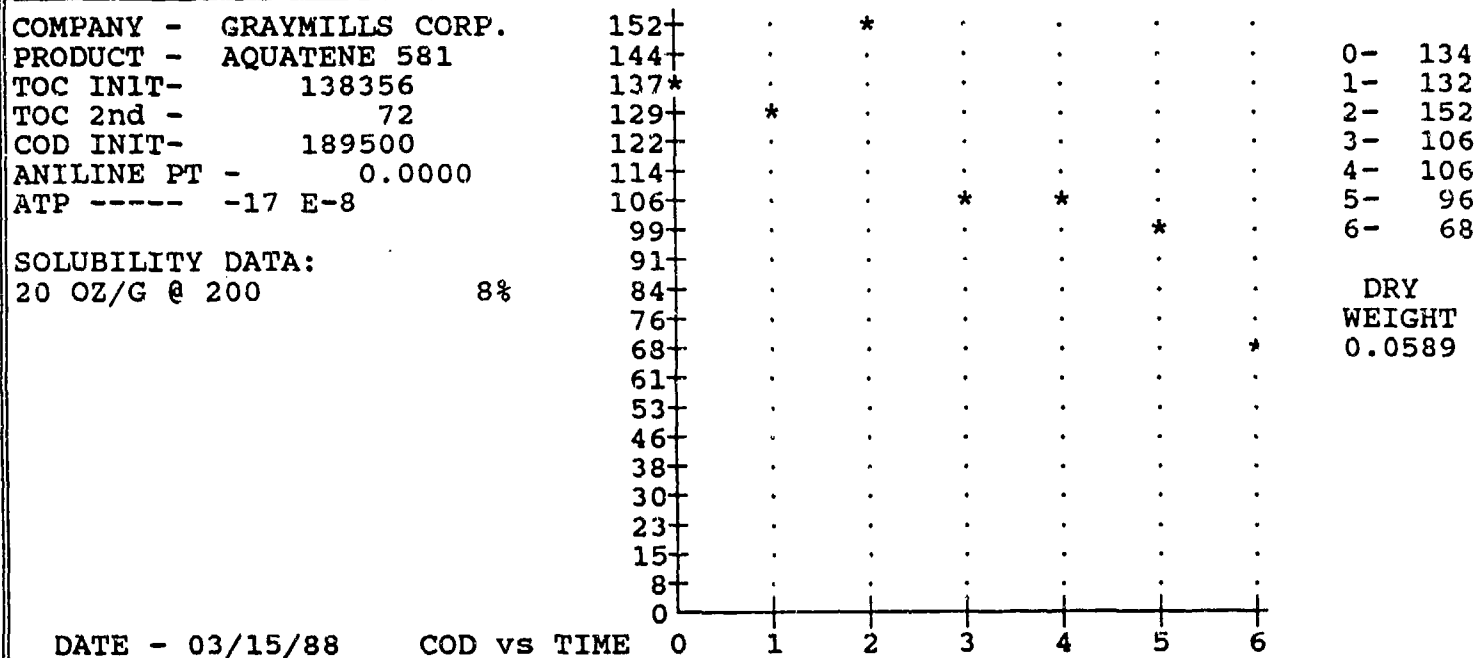
RINSED : UNRINSED
26% 20%
27% 40%
33% 22%
25% 18%
39% 49%

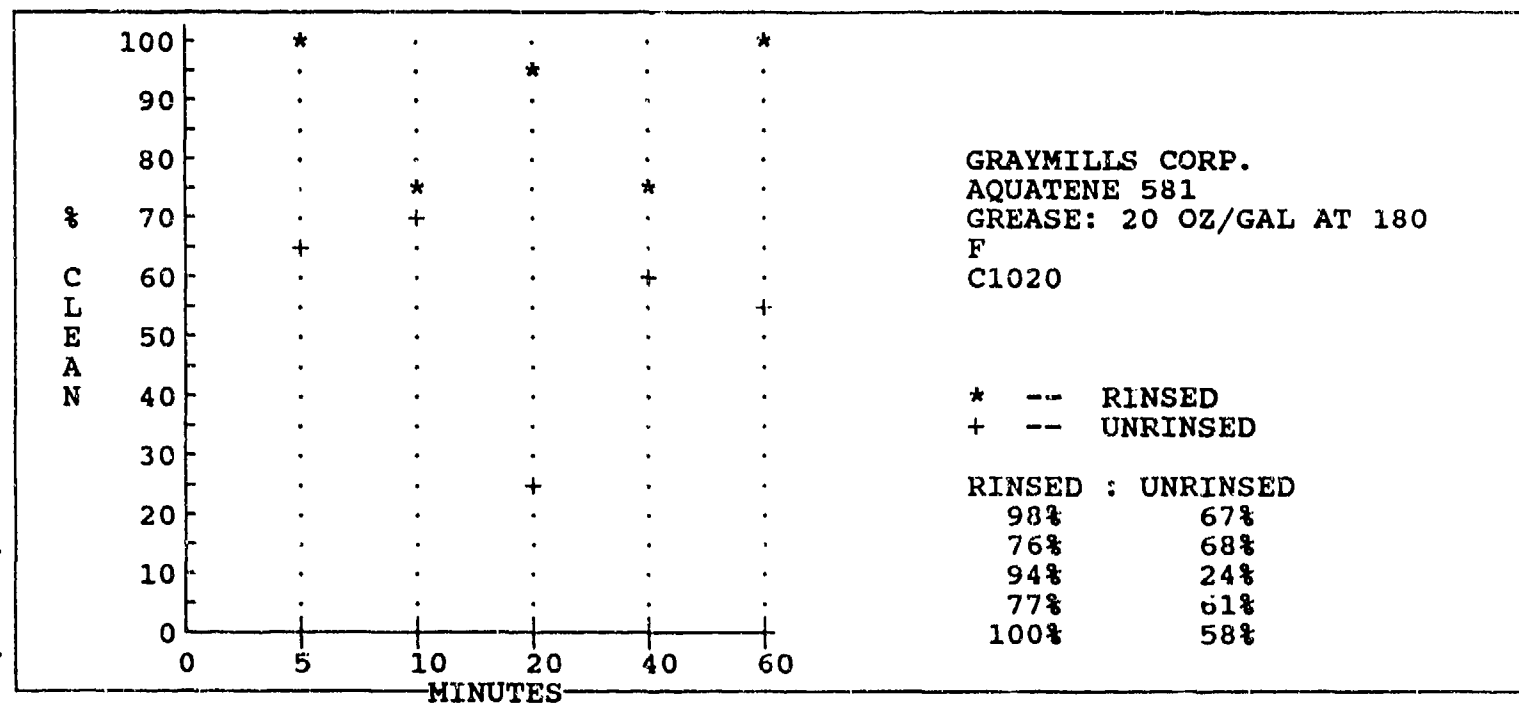
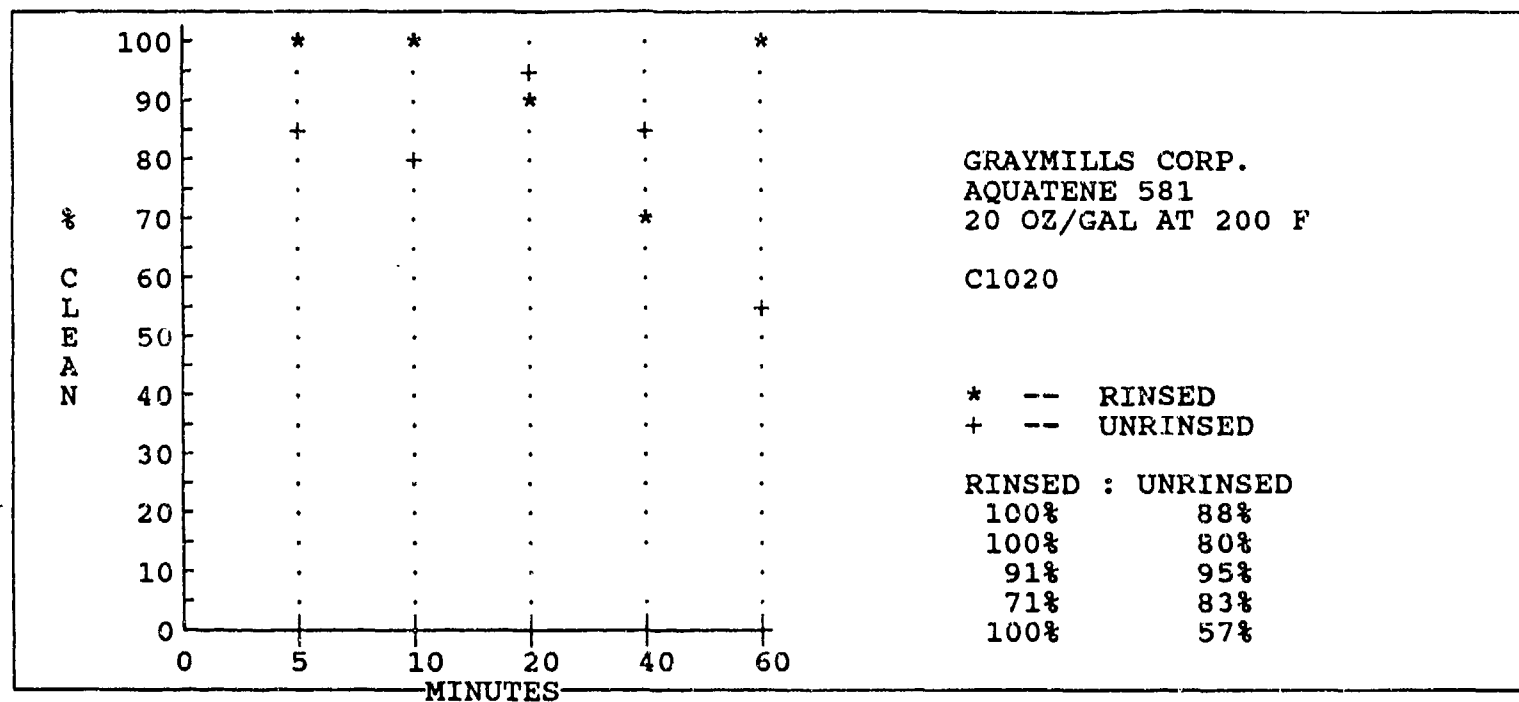


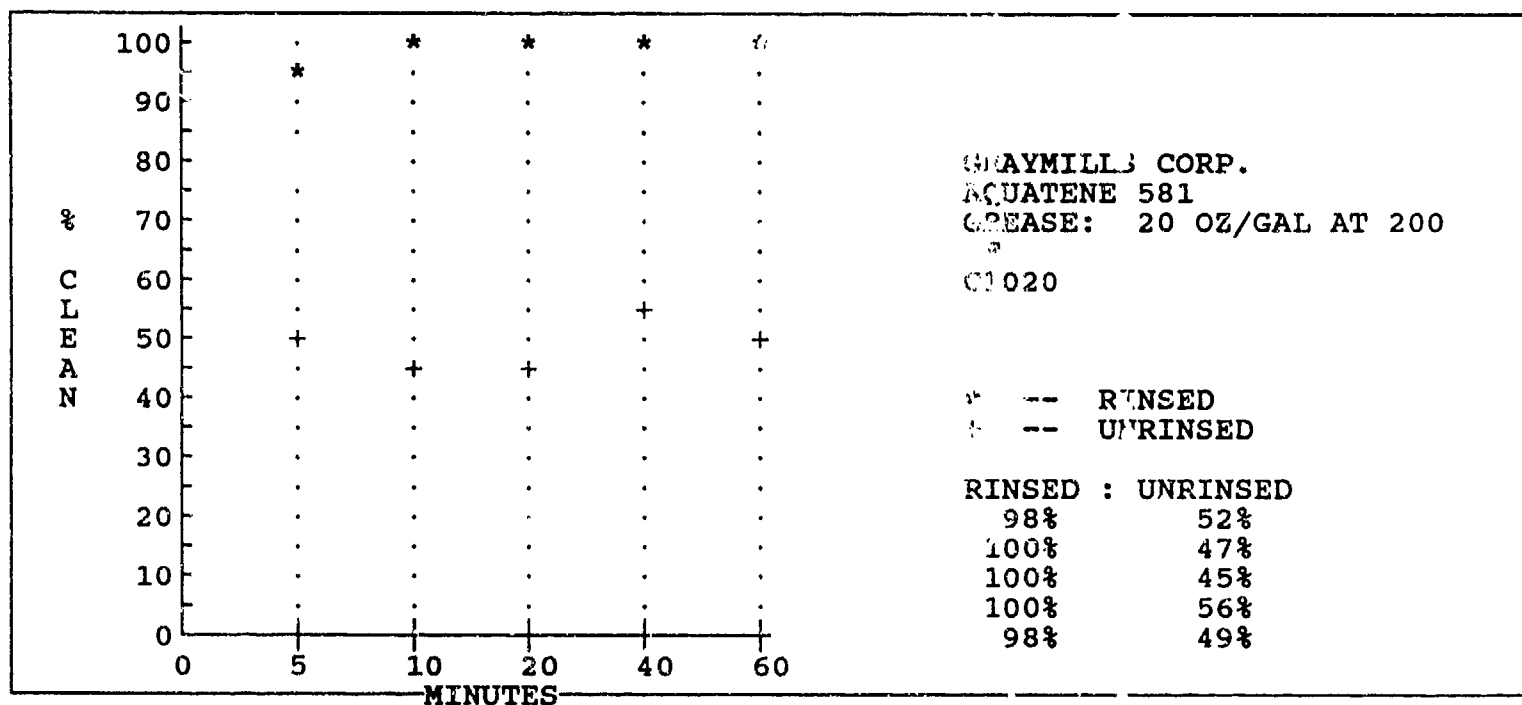
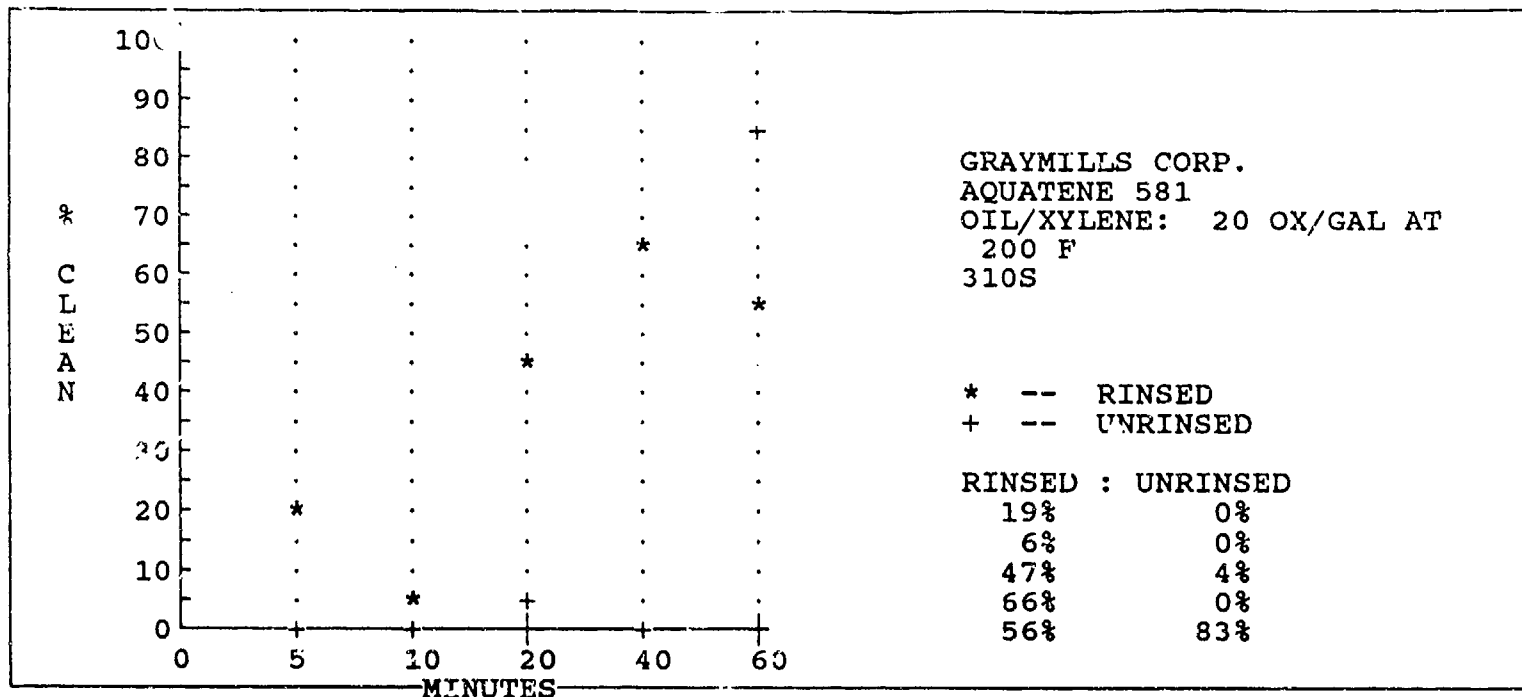


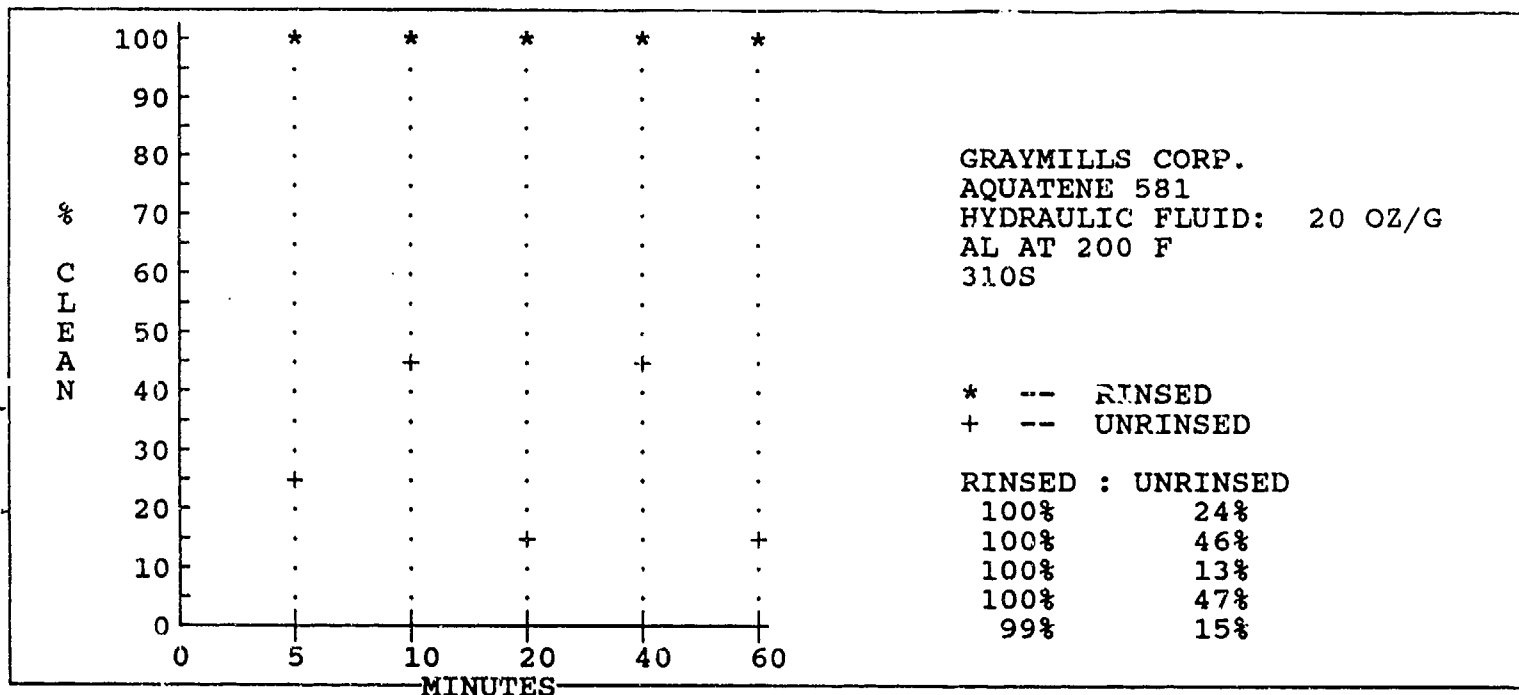












COMPANY - HOLT LLOYD CORP.	460	.	*	*	.	.	.	
PRODUCT - CHEMPRO APC	437*	.	.	.	.	.	.	0- 446
TOC INIT- 24523	414	*	.	.	.	.	.	1- 423
TOC 2nd - 0	391	.	.	.	.	.	.	2- 454
COD INIT- 141500	368	.	.	.	*	.	.	3- 460
ANILINE PT - 0.0000	345	.	.	.	.	.	.	4- 365
ATP ----- 21 E-8	322	.	.	.	.	.	*	5- 259
	299	.	.	.	.	.	.	6- 313
SOLUBILITY DATA:	276	.	.	.	.	.	.
1:2 @ AMBIE 1%	253	.	.	.	.	*	.	DRY
1:2 @ 140 0%	230	.	.	.	.	.	.	WEIGHT
1:6 @ 140 0%	207	.	.	.	.	.	.	0.0589
	184	.	.	.	.	.	.
	161	.	.	.	.	.	.
	138	.	.	.	.	.	.
	115	.	.	.	.	.	.
	92	.	.	.	.	.	.
	69	.	.	.	.	.	.
	46	.	.	.	.	.	.
	23	.	.	.	.	.	.
	0	.	.	.	.	.	.
DATE - 03/15/88	COD vs TIME	0	1	2	3	4	5	6

PHENOL	291*	.	.	.	.	.	.
03/15/88	276	.	.	.	.	.	.	0- 291
ATP - 40 E-8	262	.	.	.	.	.	.	1- 232
	247	.	.	.	.	.	.	2- 240
	233	*	*	.	.	.	.	3- 48
FORMULA IV CORPORATION	218	.	.	.	.	.	.	4- 10
MAGNA IV C-1000	204	.	.	.	.	.	.	5- 31
	189	.	.	.	.	.	.	6- 2
	175	.	.	.	.	.	.
GRAYMILLS CORP.	160	.	.	.	.	.	.	DRY
AQUATENE 330	146	.	.	.	.	.	.	WEIGHT
	131	.	.	.	.	.	.	0.0589
GRAYMILLS CORP.	116	.	.	.	.	.	.
AQUATENE 571	102	.	.	.	.	.	.
	87	.	.	.	.	.	.
GRAYMILLS CORP.	73	.	.	.	.	.	.
AQUATENE 581	58	.	.	.	.	.	.
	44	.	.	*	.	.	.	
HOLT LLOYD CORP.	29	.	.	.	.	*	.
CHEMPRO APC	15	.	.	.	*	.	.	
	0	.	.	.	.	.	*
DATE - 03/15/88	COD vs TIME	0	1	2	3	4	5	6

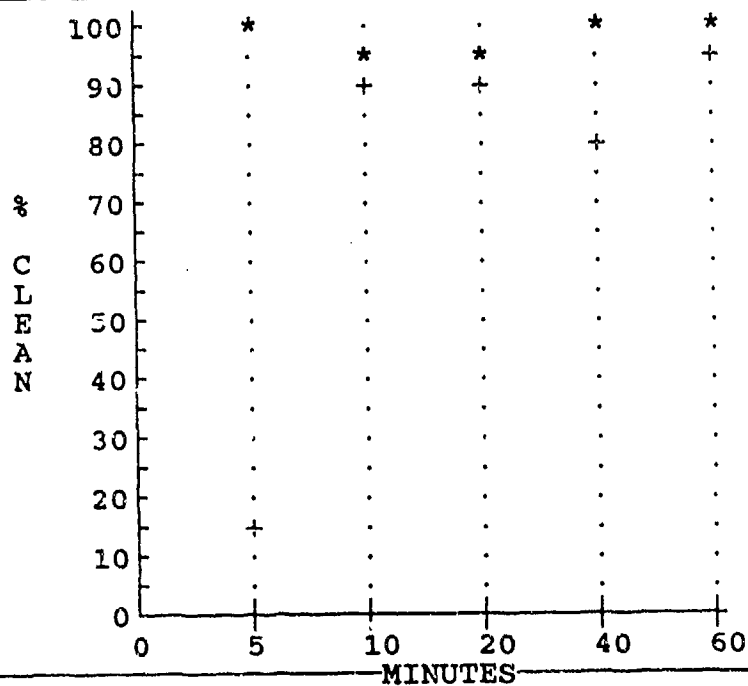
HOLT LLOYD CORP.
CHEMPRO APC
GREASE: 1:2 AT AMBIENT

A12024

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED

98%	17%
97%	91%
95%	90%
98%	78%
100%	36%

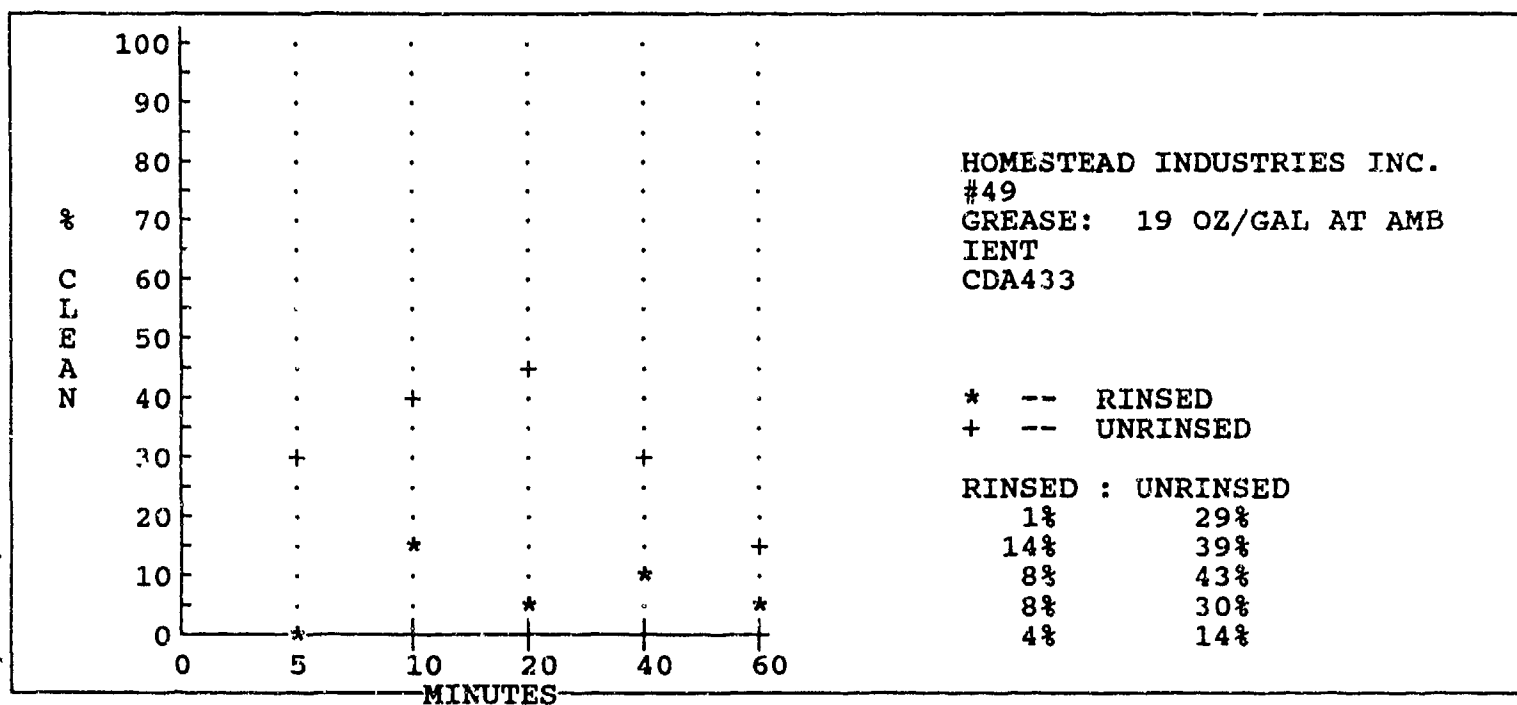
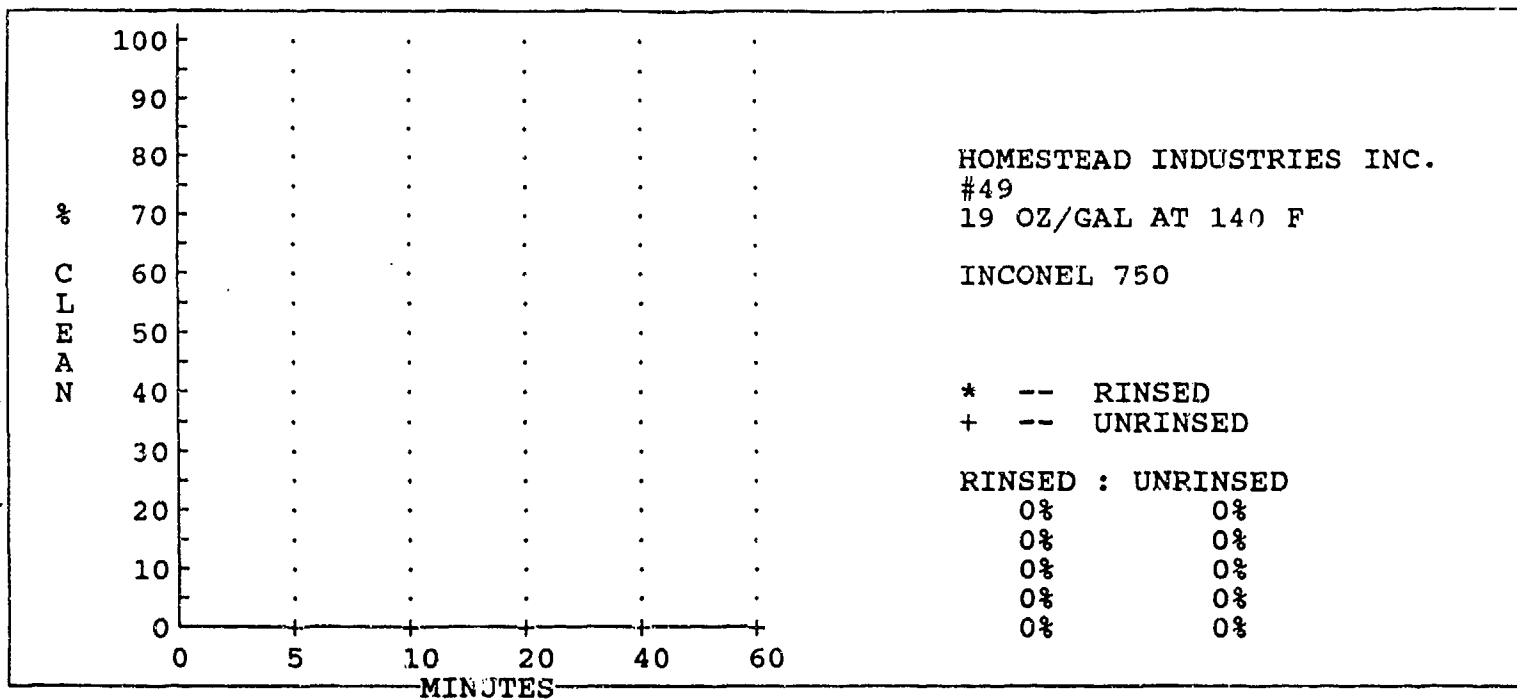


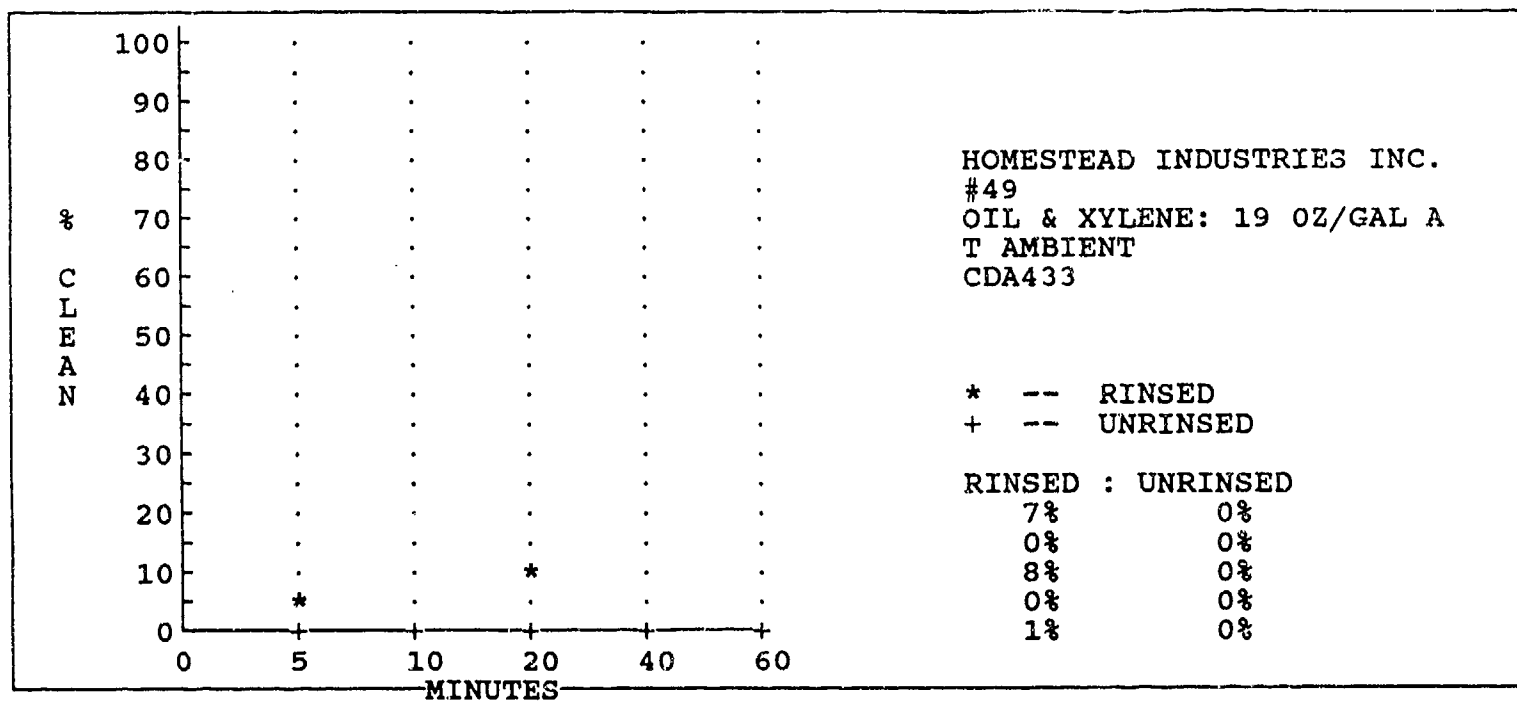
COMPANY - HOMESTEAD INDUSTRI	96	.	.	.	*	.	.	
PRODUCT - #49	91	.	.	.	.	.	.	0- 44
TOC INIT- 21183	86	.	.	.	.	.	.	1- 42
TOC 2nd - 0	82	.	.	.	.	.	.	2- 0
COD INIT- 25	77	.	.	.	.	.	.	3- 72
ANILINE PT - 0.0000	72	.	.	*	.	.	.	4- 96
ATP ----- -16 E-8	67	.	.	.	.	.	.	5- 47
	62	.	.	.	.	.	.	6- 20
SOLUBILITY DATA:	58	.	.	.	.	.	.
	53	.	.	.	.	.	.	DRY
	48	.	.	.	.	*	.	WEIGHT
	43*	*	.	.	.	.	.	0.0594
	38	.	.	.	.	.	.
	34	.	.	.	.	.	.
	29	.	.	.	.	.	.
	24	.	.	.	.	.	.
	19	.	.	.	.	.	*
	14	.	.	.	.	.	.
	10	.	.	.	.	.	.
	5	.	.	.	.	.	.
	0	.	.	.	.	.	.

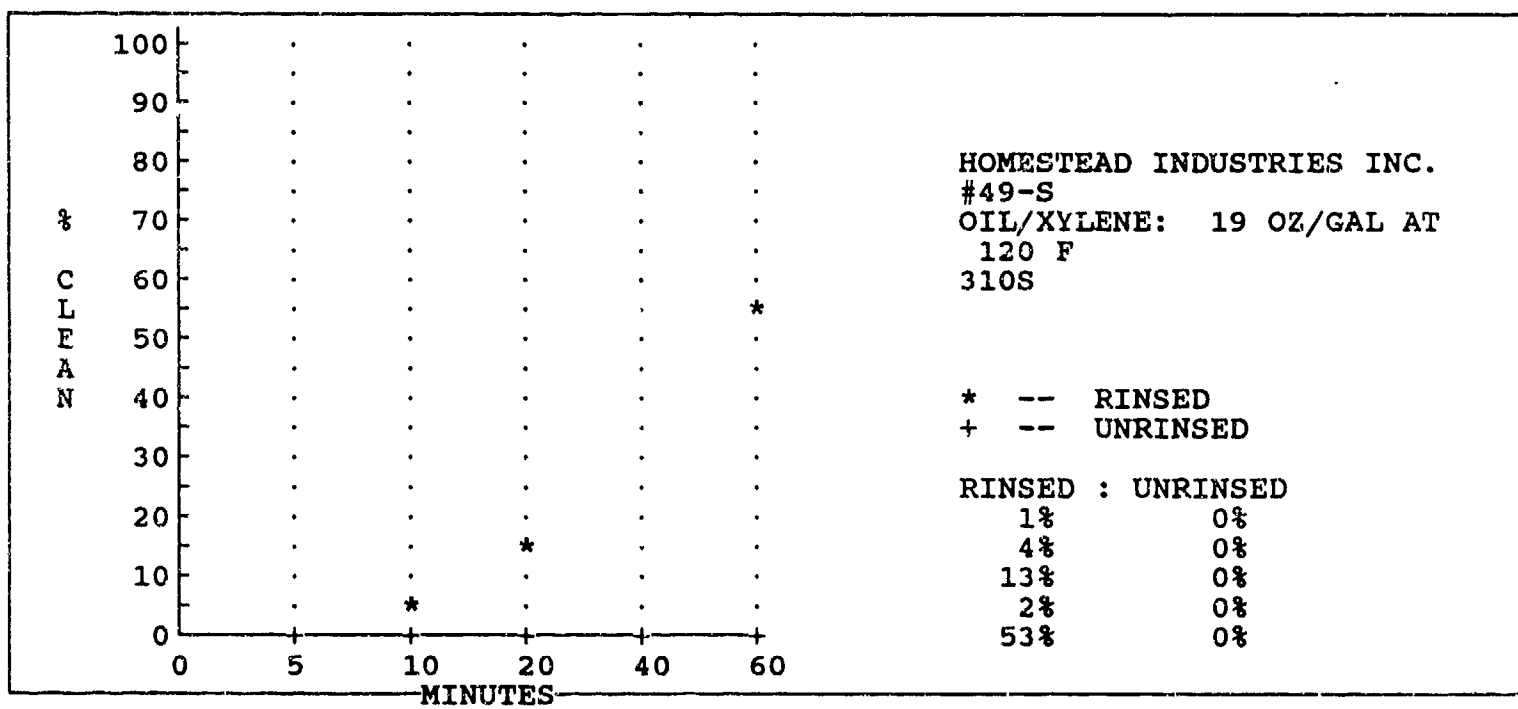
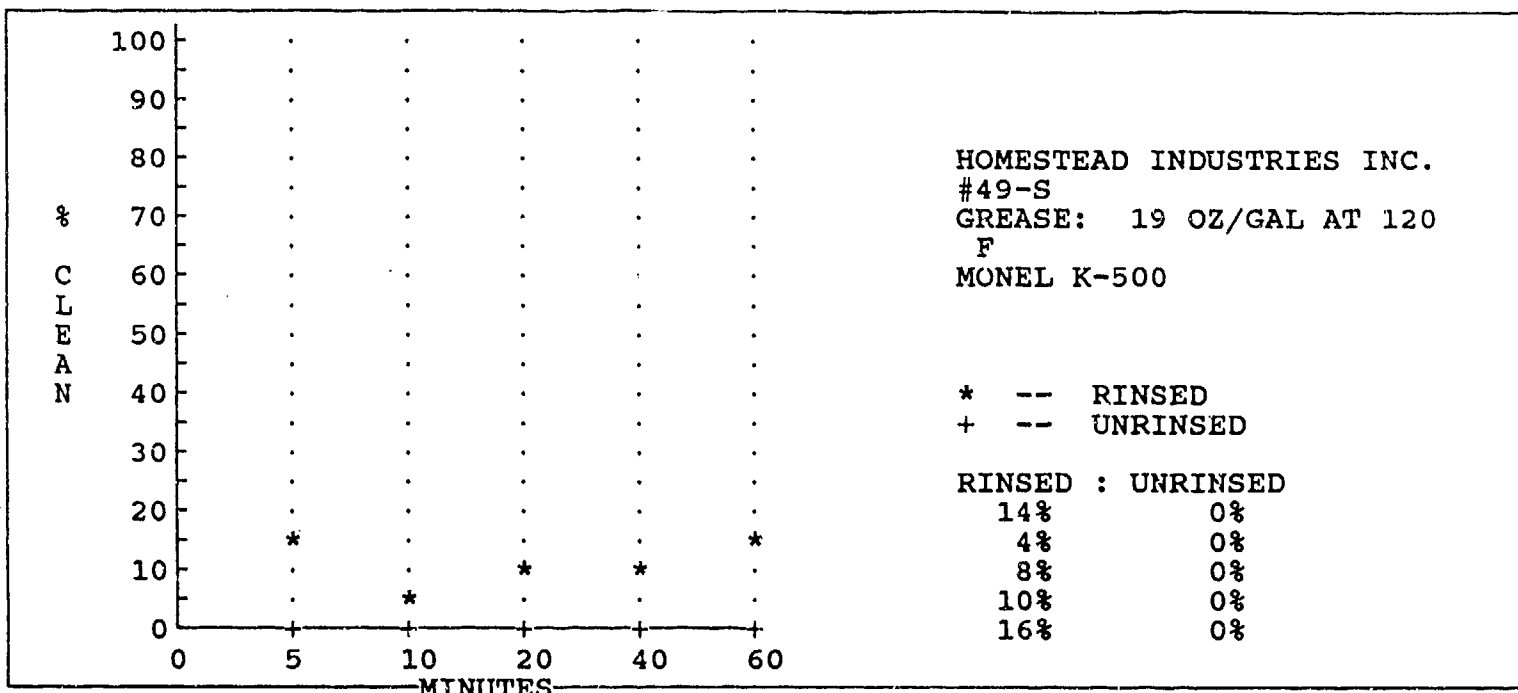
DATE - 03/16/88 COD vs TIME 0 1 2 3 4 5 6

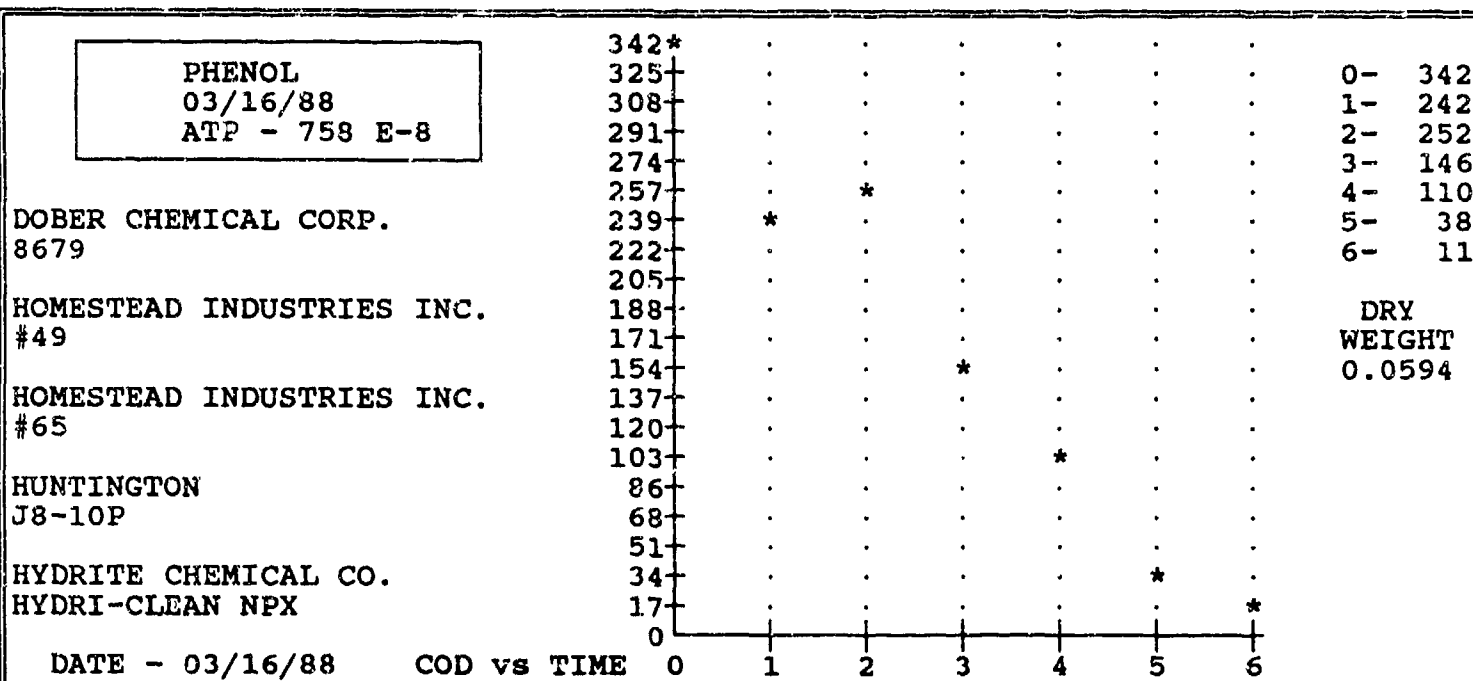
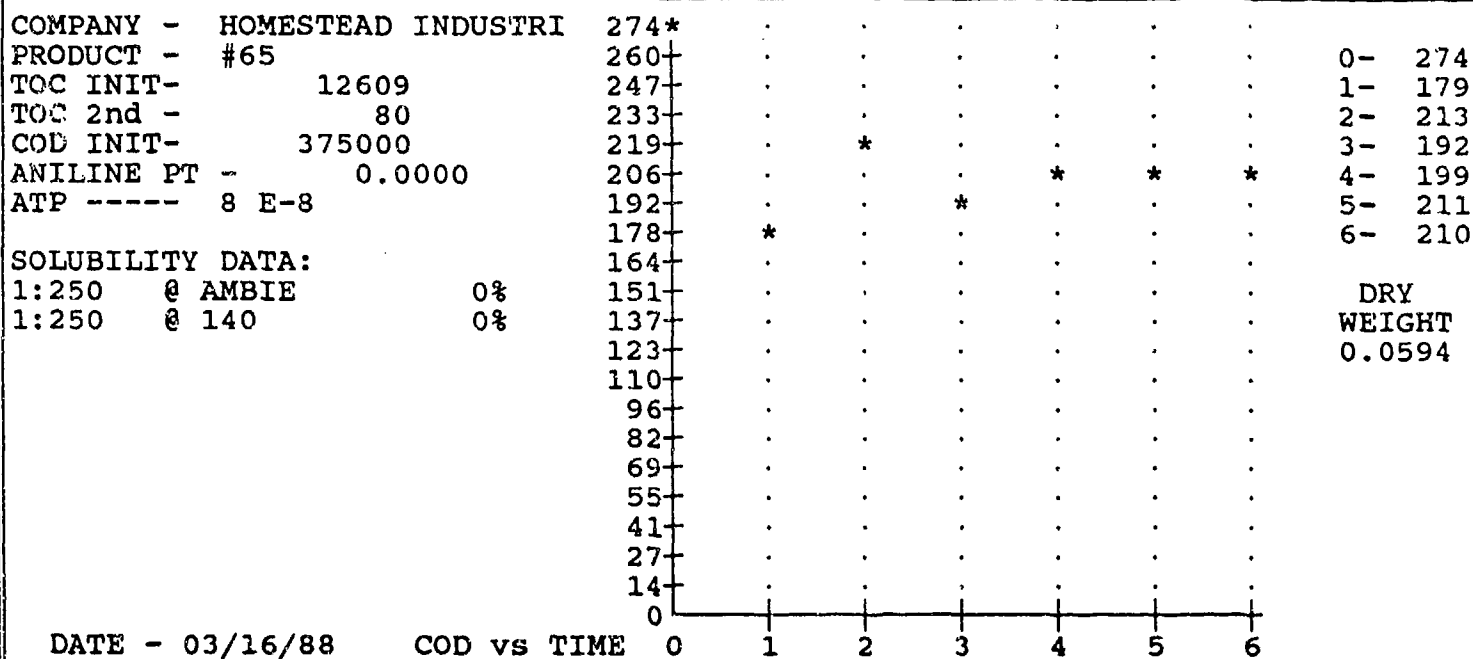
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PHENOL 03/16/88 ATP - 758 E-8 </div>	342*	.	.	.	.	.	.
	325	.	.	.	.	.	.	0- 342
	308	.	.	.	.	.	.	1- 242
	291	.	.	.	.	.	.	2- 252
	274	.	.	.	.	.	.	3- 146
	257	.	*	.	.	.	.	4- 110
DOBER CHEMICAL CORP.	239	*	.	.	.	.	.	5- 38
8679	222	.	.	.	.	.	.	6- 11
	205	.	.	.	.	.	.
HOMESTEAD INDUSTRIES INC.	188	.	.	.	.	.	.	DRY
#49	171	.	.	.	.	.	.	WEIGHT
	154	.	.	*	.	.	.	0.0594
HOMESTEAD INDUSTRIES INC.	137	.	.	.	.	.	.
#65	120	.	.	.	.	.	.
	103	.	.	.	*	.	.	
HUNTINGTON	86	.	.	.	.	.	.
J8-10P	68	.	.	.	.	.	.
	51	.	.	.	.	.	.
HYDRITE CHEMICAL CO.	34	.	.	.	.	*	.
HYDRI-CLEAN NPX	17	.	.	.	.	.	*
	0	.	.	.	.	.	.

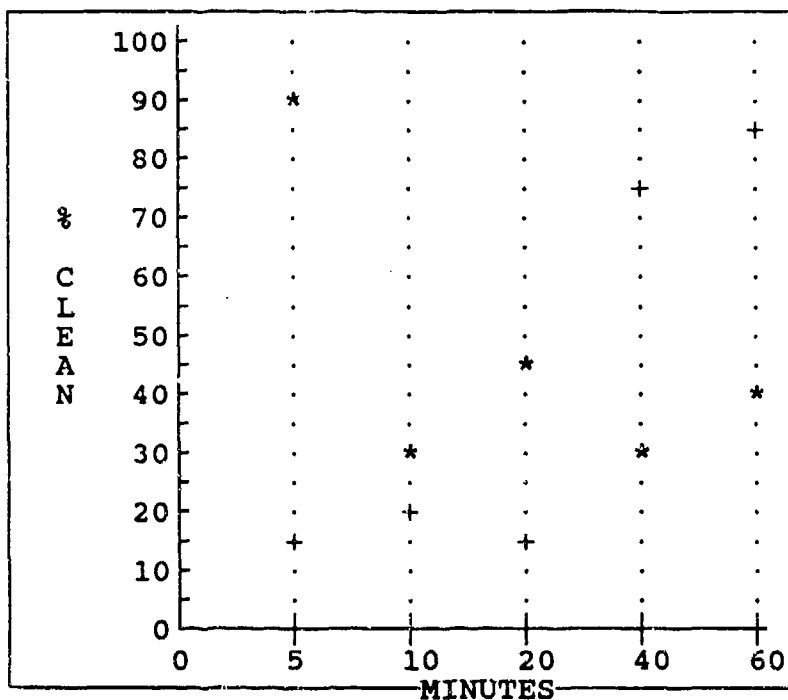
DATE - 03/16/88 COD vs TIME 0 1 2 3 4 5 6







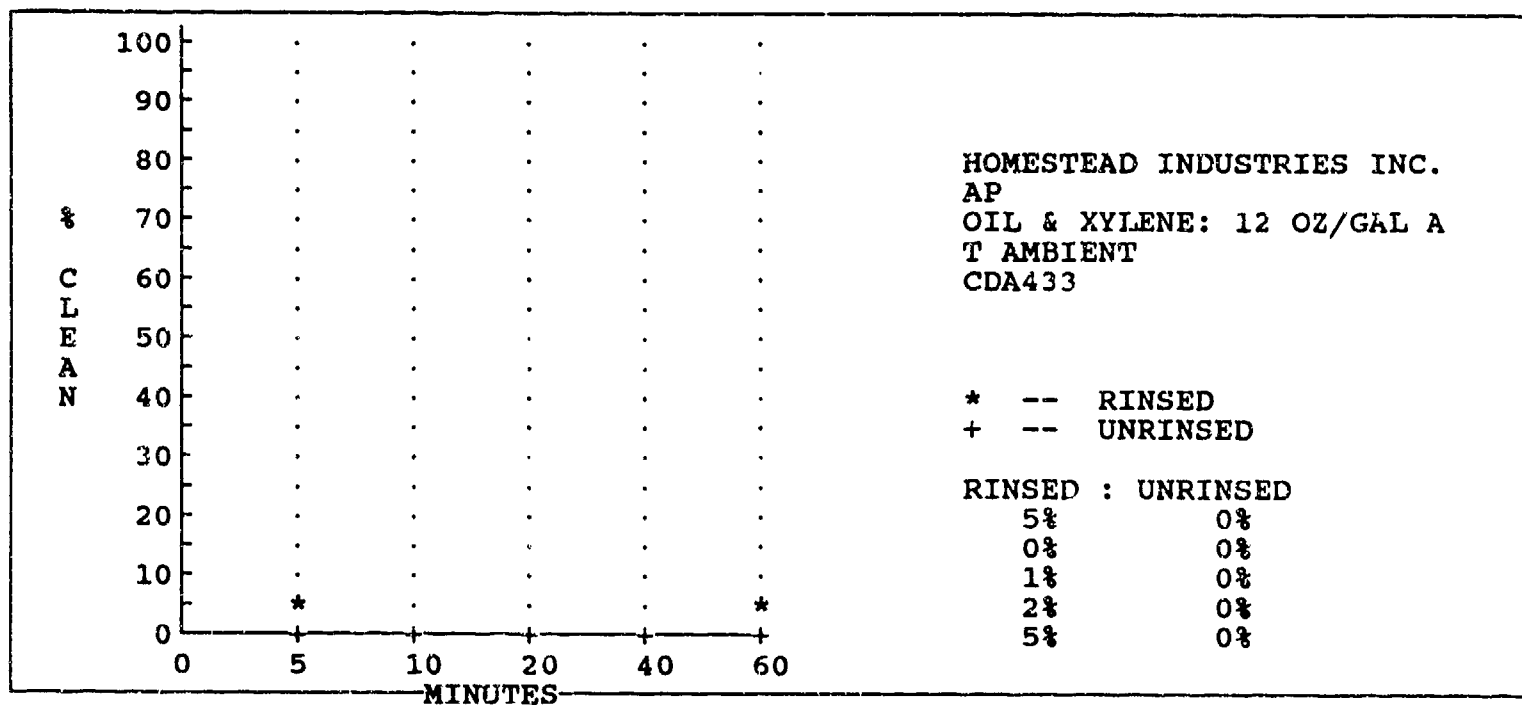
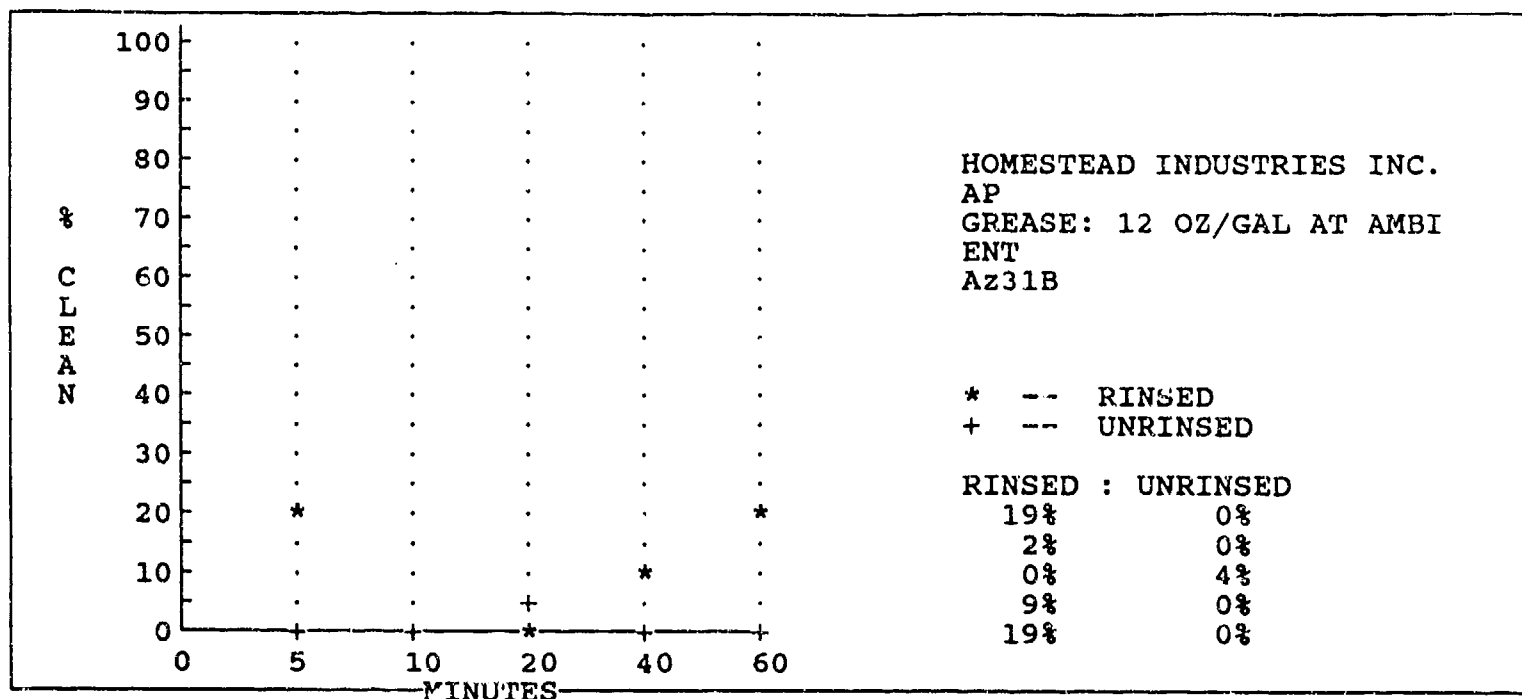




HOMESTEAD INDUSTRIES INC.
#65
GREASE: 1:250 AT 160 F
INCONEL 750

* -- RINSED
+ -- UNRINSED

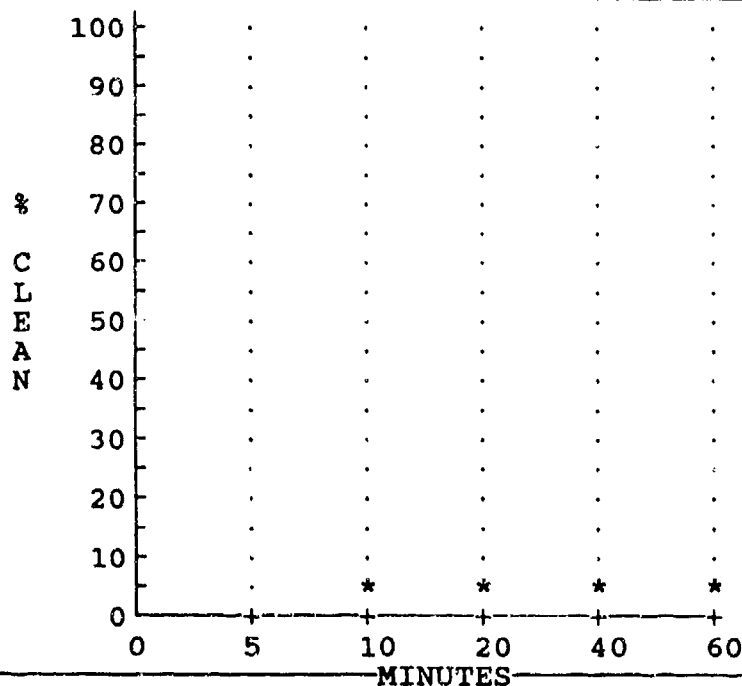
RINSED : UNRINSED	
89%	13%
30%	19%
46%	14%
30%	75%
42%	85%

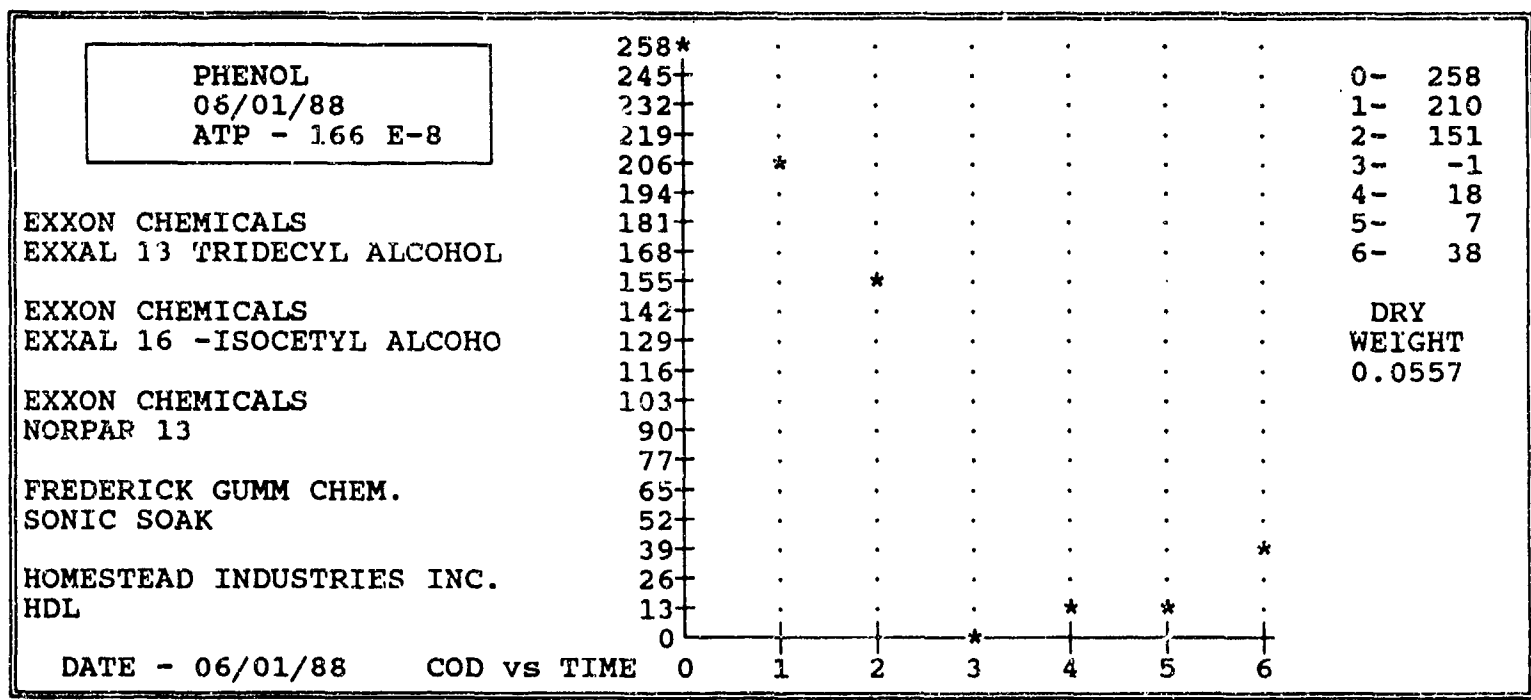
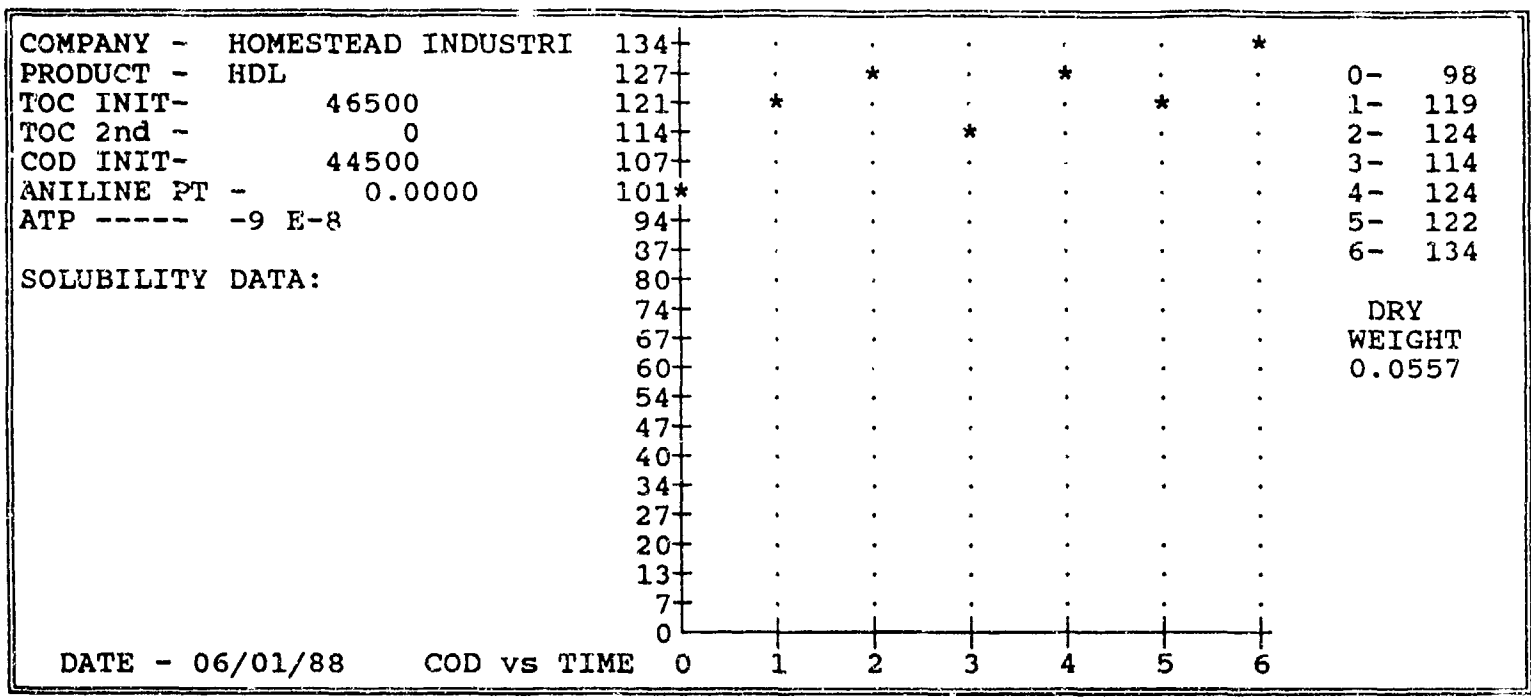


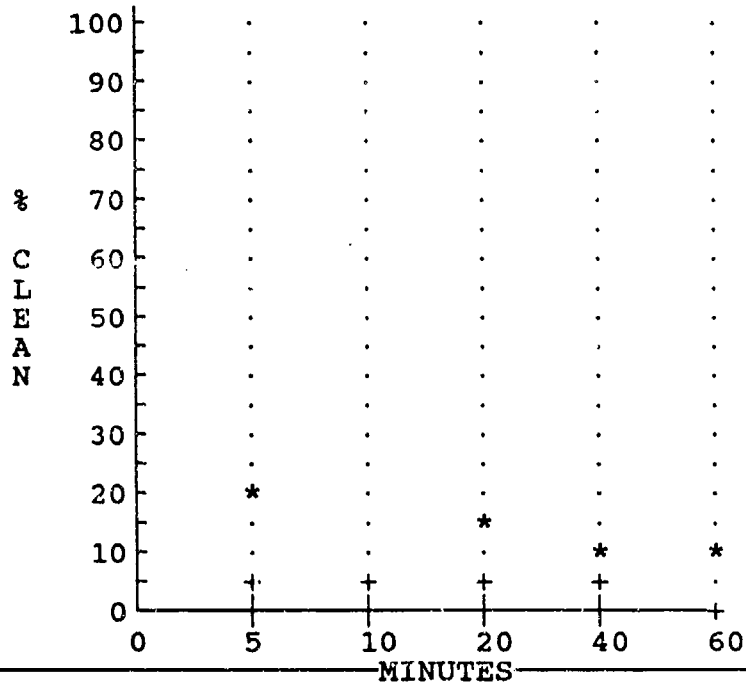
HOMESTEAD INDUSTRIES INC.
 AP
 OIL/XYLENE: 12 OZ/GAL AT
 120 F
 MONEL K-500

* -- RINSED
 + -- UNRINSED

RINSED : UNRINSED	
0%	0%
3%	0%
4%	0%
7%	0%
3%	0%







HOMESTEAD INDUSTRIES INC.
HDL
GREASE: 1:250 AT AMBIENT
CDA433

* -- RINSED
+ -- UNRINSED

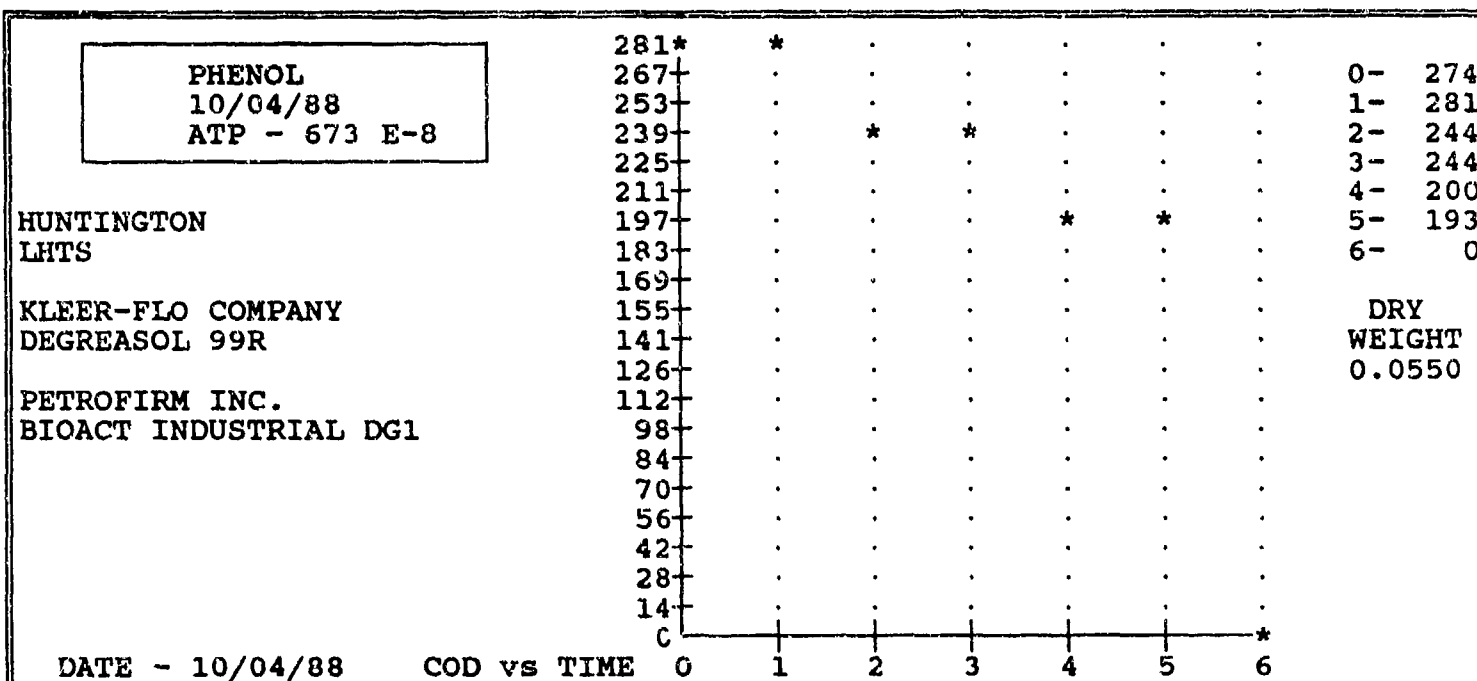
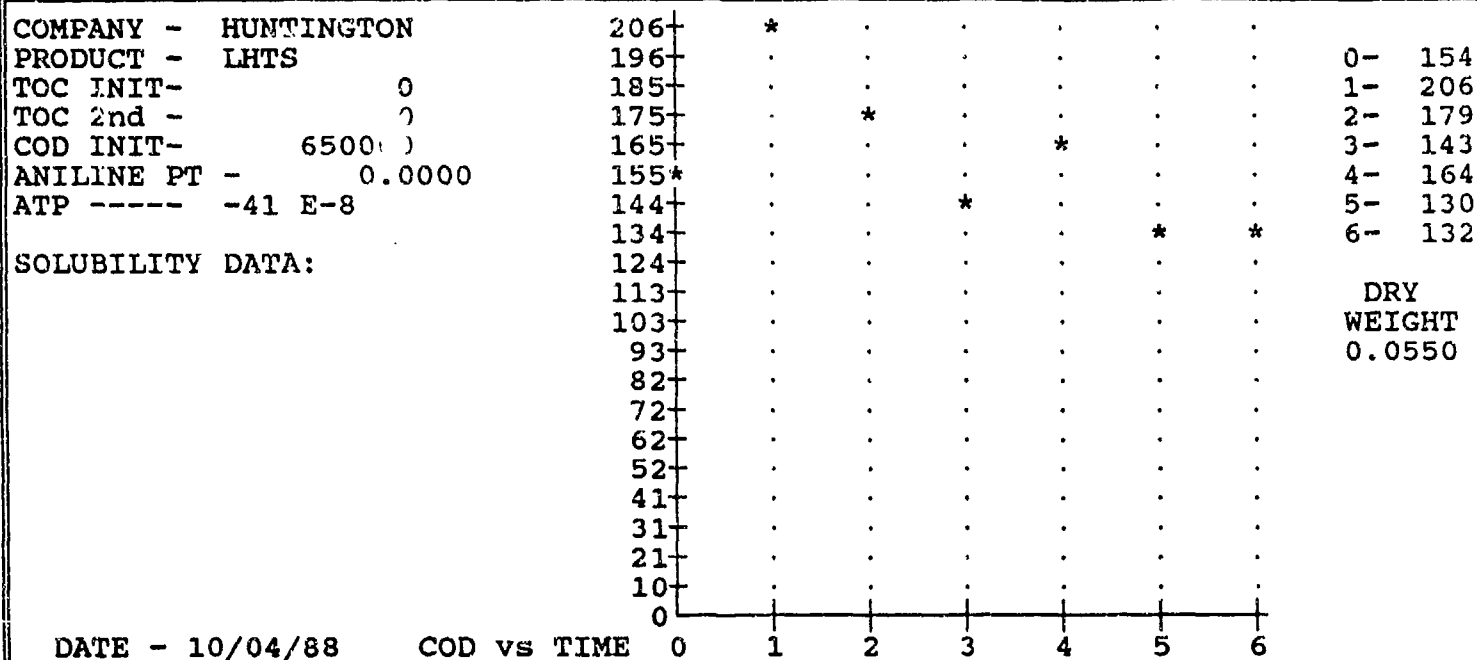
RINSED : UNRINSED	
18%	5%
7%	4%
16%	4%
11%	6%
11%	0%

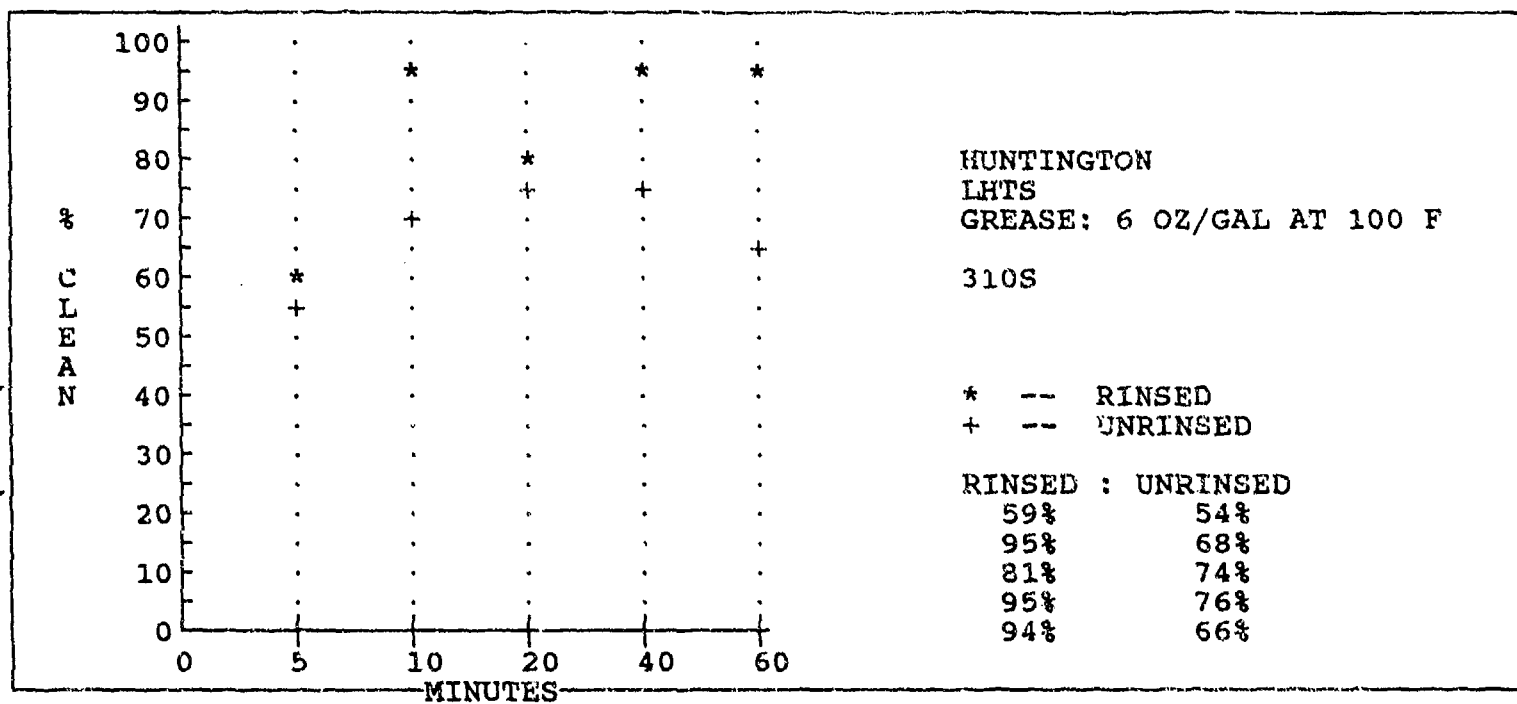
COMPANY - HUNTINGTON	450*	.	*	*	.	*	*	
PRODUCT - J8-10P	428	.	.	.	.	.	.	0- 446
TOC INIT- 0	405	*	.	.	.	.	.	1- 401
TOC 2nd - 0	383	.	.	.	*	.	.	2- 441
COD INIT- 159000	360	.	.	.	.	.	.	3- 446
ANILINE PT - 0.0000	338	.	.	.	.	.	.	4- 388
ATP ----- 2 E-8	315	.	.	.	.	.	.	5- 444
	293	.	.	.	.	.	.	6- 450
SOLUBILITY DATA:	270	.	.	.	.	.	.
	248	.	.	.	.	.	.	DRY
	225	.	.	.	.	.	.	WEIGHT
	203	.	.	.	.	.	.	0.0594
	180	.	.	.	.	.	.
	158	.	.	.	.	.	.
	135	.	.	.	.	.	.
	113	.	.	.	.	.	.
	90	.	.	.	.	.	.
	68	.	.	.	.	.	.
	45	.	.	.	.	.	.
	23	.	.	.	.	.	.
	0	.	.	.	.	.	.
DATE - 03/16/88	COD vs TIME	0	1	2	3	4	5	6

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PHENOL 03/16/88 ATP - 758 E-8 </div>	342*	.	.	.	.	.	.
	325	.	.	.	.	.	.	0- 342
	308	.	.	.	.	.	.	1- 242
	291	.	.	.	.	.	.	2- 252
	274	.	.	.	.	.	.	3- 146
	257	.	*	.	.	.	.	4- 110
DOBER CHEMICAL CORP.	239	*	.	.	.	.	.	5- 38
8679	222	.	.	.	.	.	.	6- 11
	205	.	.	.	.	.	.
HOMESTEAD INDUSTRIES INC.	188	.	.	.	.	.	.	DRY
#49	171	.	.	.	.	.	.	WEIGHT
	154	.	.	*	.	.	.	0.0594
HOMESTEAD INDUSTRIES INC.	137	.	.	.	.	.	.
#65	120	.	.	.	.	.	.
	103	.	.	.	*	.	.	
HUNTINGTON	86	.	.	.	.	.	.
J8-10P	68	.	.	.	.	.	.
	51	.	.	.	.	.	.
HYDRITE CHEMICAL CO.	34	.	.	.	.	*	.
HYDRI-CLEAN NPX	17	.	.	.	.	.	*
	0	.	.	.	.	.	.
DATE - 03/16/88	COD vs TIME	0	1	2	3	4	5	6

COMPANY - HUNTINGTON	714	*	.	.	.	.	.	.
PRODUCT - LHTS	678	.	.	.	.	.	.	.	0- 110
TOC INIT- 0	643	.	.	.	.	.	.	.	1- 714
TOC 2nd - 0	607	.	.	.	.	.	.	.	2- 135
COD INIT- 650000	571	.	.	.	.	.	.	.	3- 122
ANILINE PT - 0.0000	536	.	.	.	.	.	.	.	4- 160
ATP ----- -87 E-8	500	.	.	.	.	.	.	.	5- 113
	464	.	.	.	.	.	.	.	6- 156
SOLUBILITY DATA:	428	.	.	.	.	.	.	.
	393	.	.	.	.	.	.	.	DRY
	357	.	.	.	.	.	.	.	WEIGHT
	321	.	.	.	.	.	.	.	0.0400
	286	.	.	.	.	.	.	.
	250	.	.	.	.	.	.	.
	214	.	.	.	.	.	.	.
	179	.	.	.	.	.	.	.
	143	.	*	.	*	.	*	*	
	107*	.	.	*	.	*	.	.	
	71	.	.	.	.	.	.	.
	36	.	.	.	.	.	.	.
	0	.	.	.	.	.	.	.
DATE - 06/21/88	COD vs TIME	0	1	2	3	4	5	6	

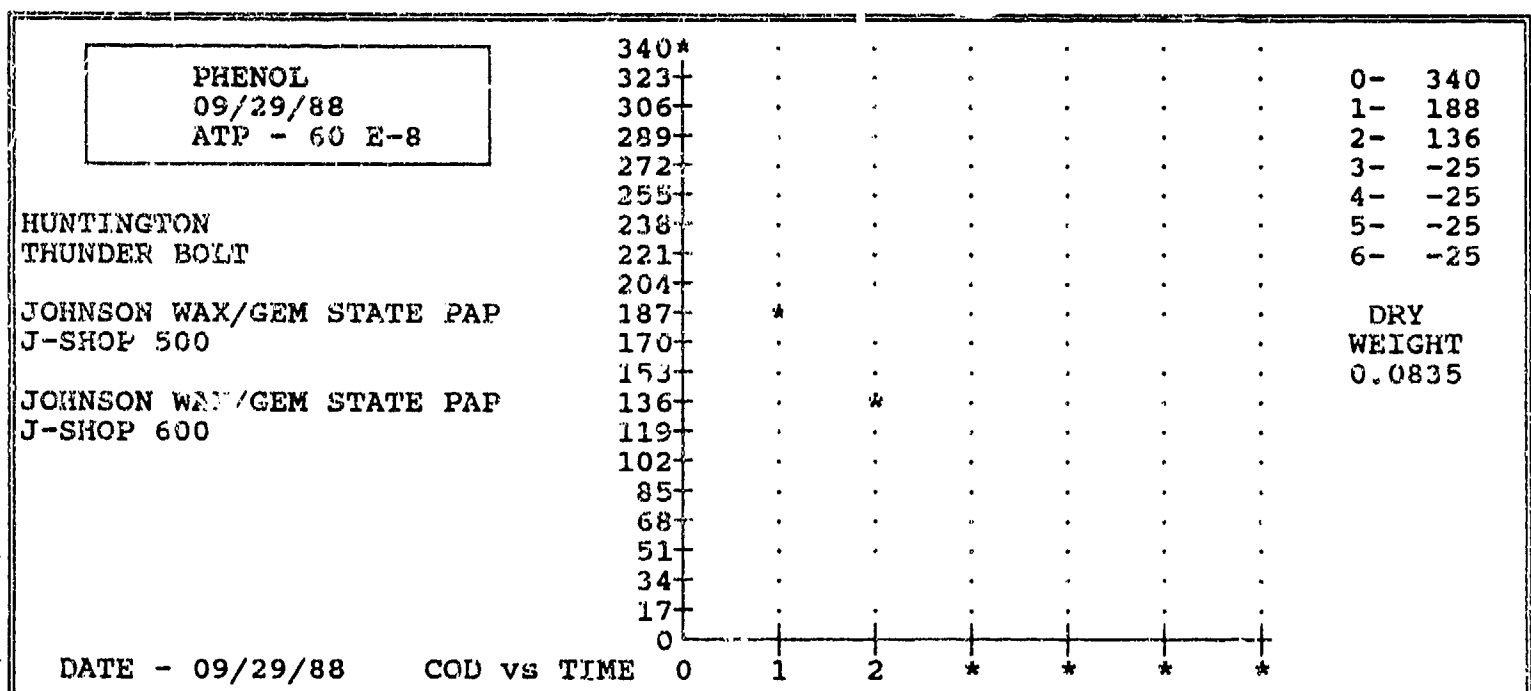
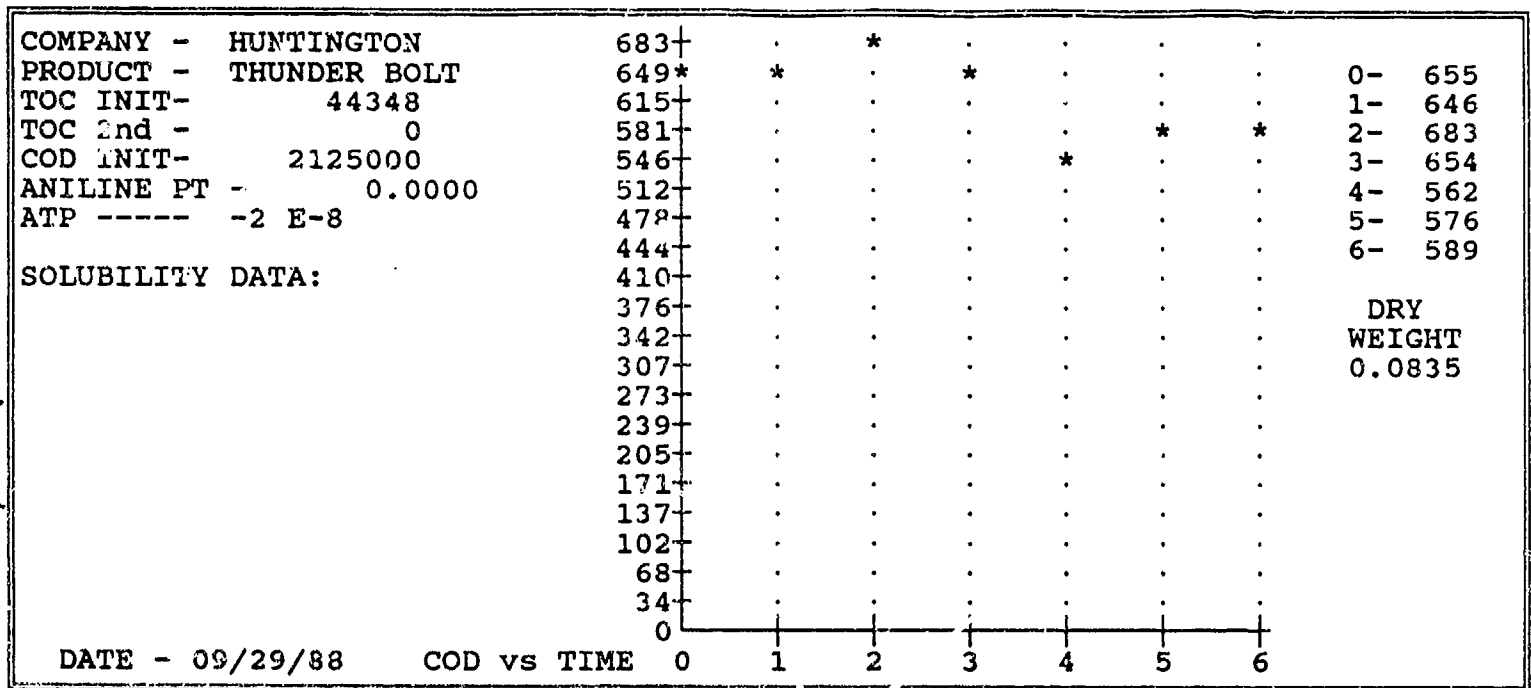
PHENOL	261	*	.	.	.	.	.	.
06/21/88	248*	.	.	.	.	.	.	.	0- 254
ATP - -42 E-8	235	.	.	.	.	.	.	.	1- 261
	222	.	*	*	*	.	.	.	2- 220
	209	.	.	.	.	*	.	.	3- 216
	196	.	.	.	.	.	*	.	4- 224
HUNTINGTON	183	.	.	.	.	.	.	.	5- 204
LHTS	170	.	.	.	.	.	.	.	6- 199
	157	.	.	.	.	.	.	.
HUNTINGTON	144	.	.	.	.	.	.	.	DRY
THUNDER BOLT	131	.	.	.	.	.	.	.	WEIGHT
	117	.	.	.	.	.	.	.	0.0400
	104	.	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	91	.	.	.	.	.	.	.
BIG BARE	78	.	.	.	.	.	.	.
	65	.	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	52	.	.	.	.	.	.	.
J-SHOP 500	39	.	.	.	.	.	.	.
	26	.	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	13	.	.	.	.	.	.	.
J-SHOP 600	0	.	.	.	.	.	.	.
DATE - 06/21/88	COD vs TIME	0	1	2	3	4	5	6	

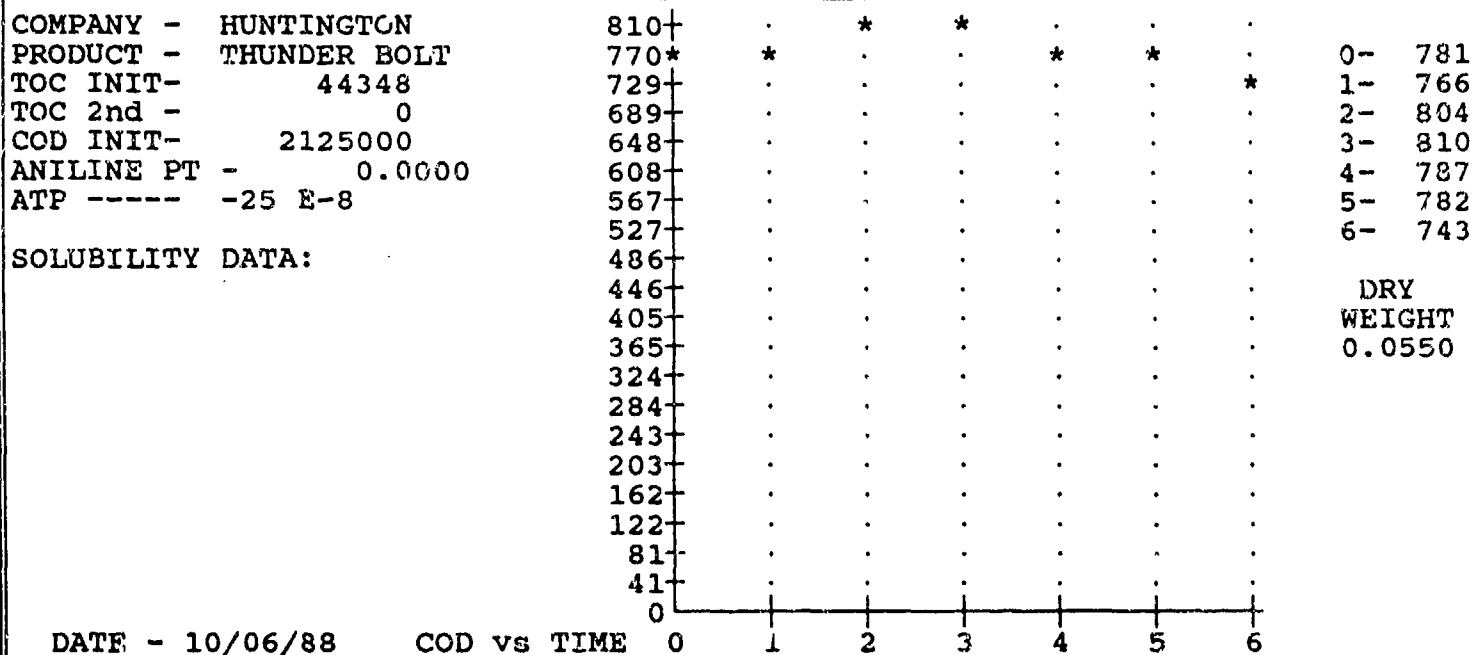


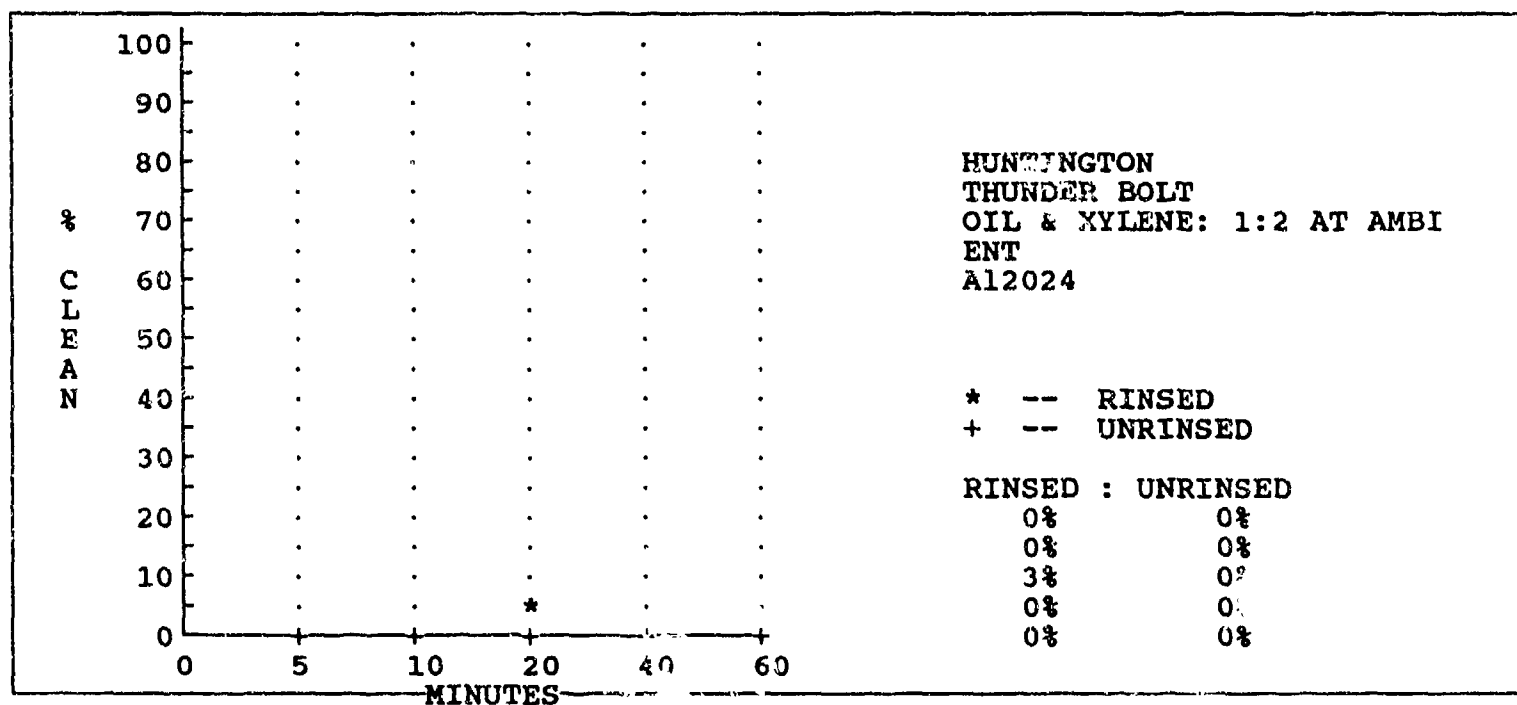
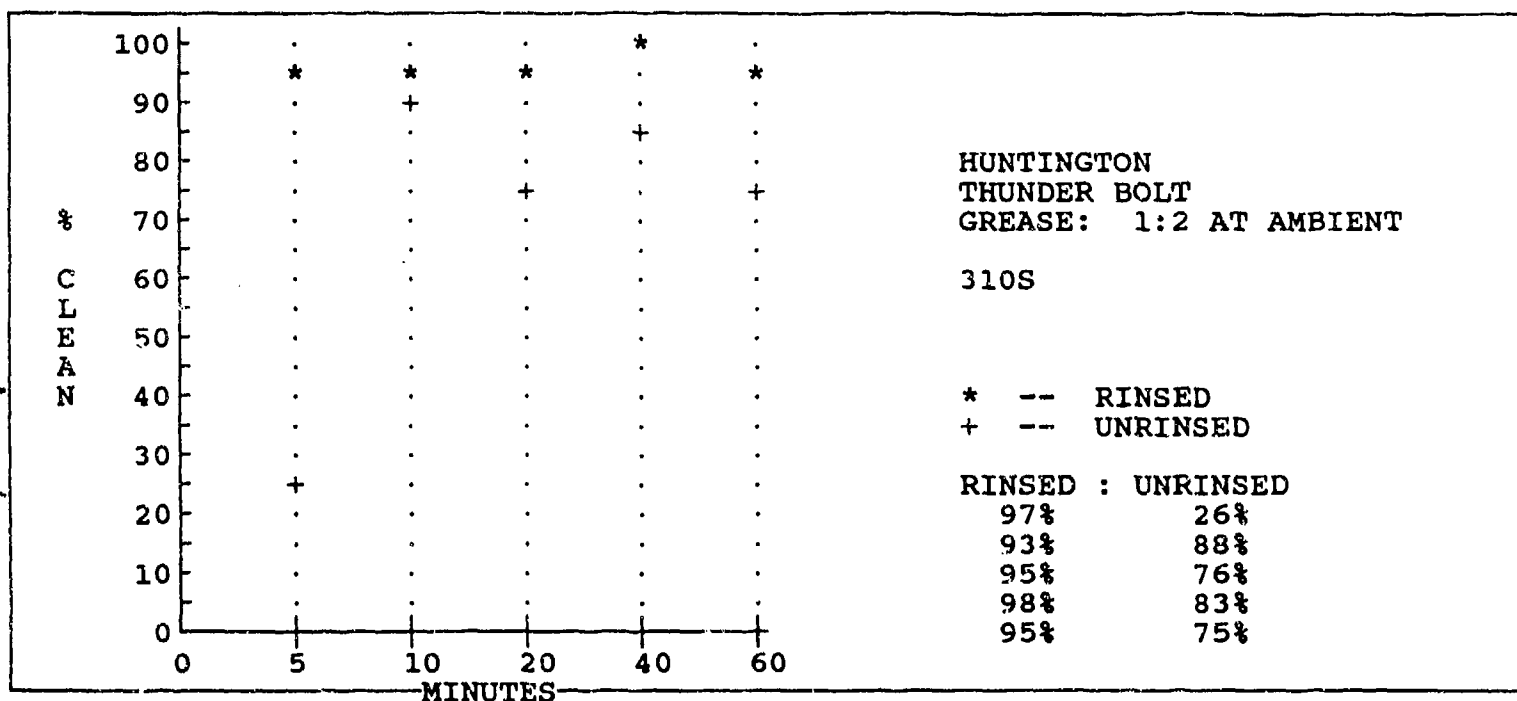


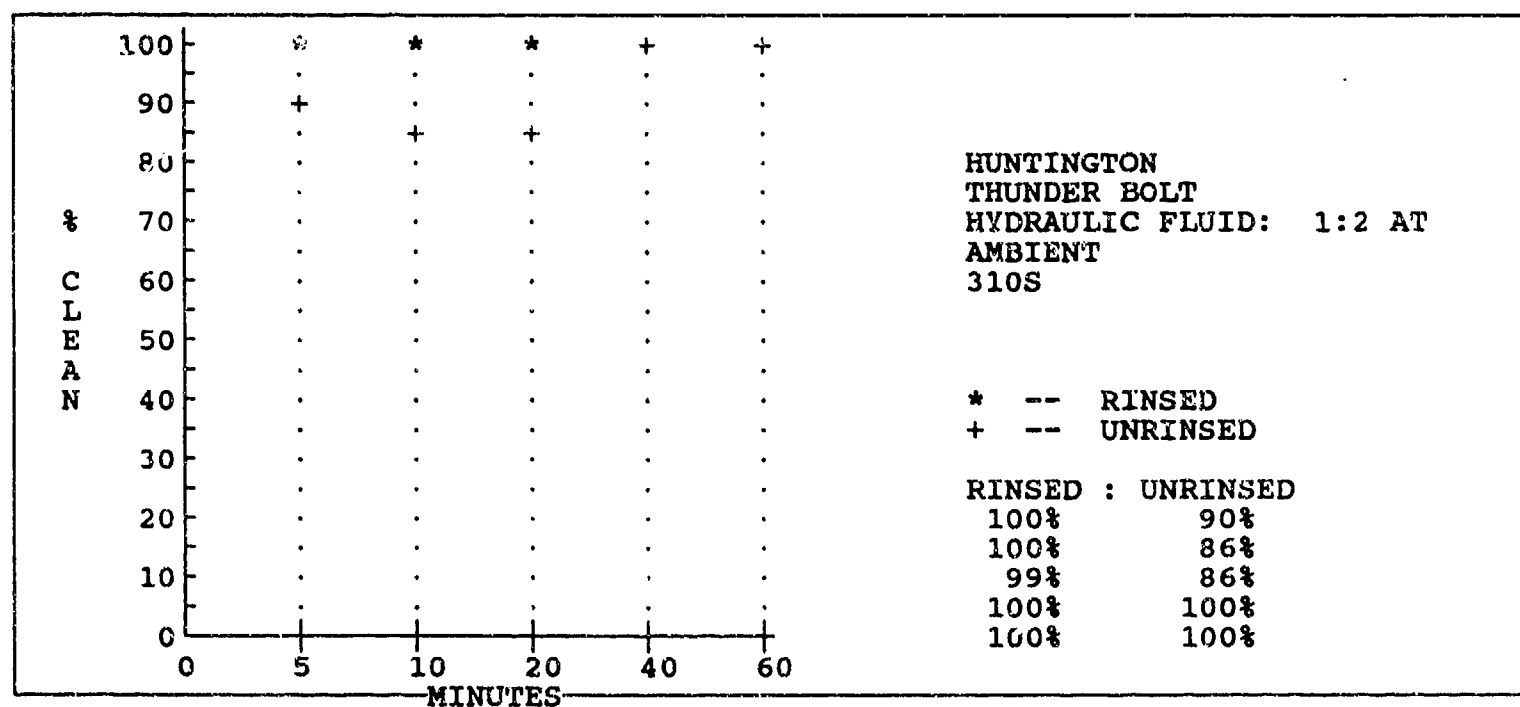
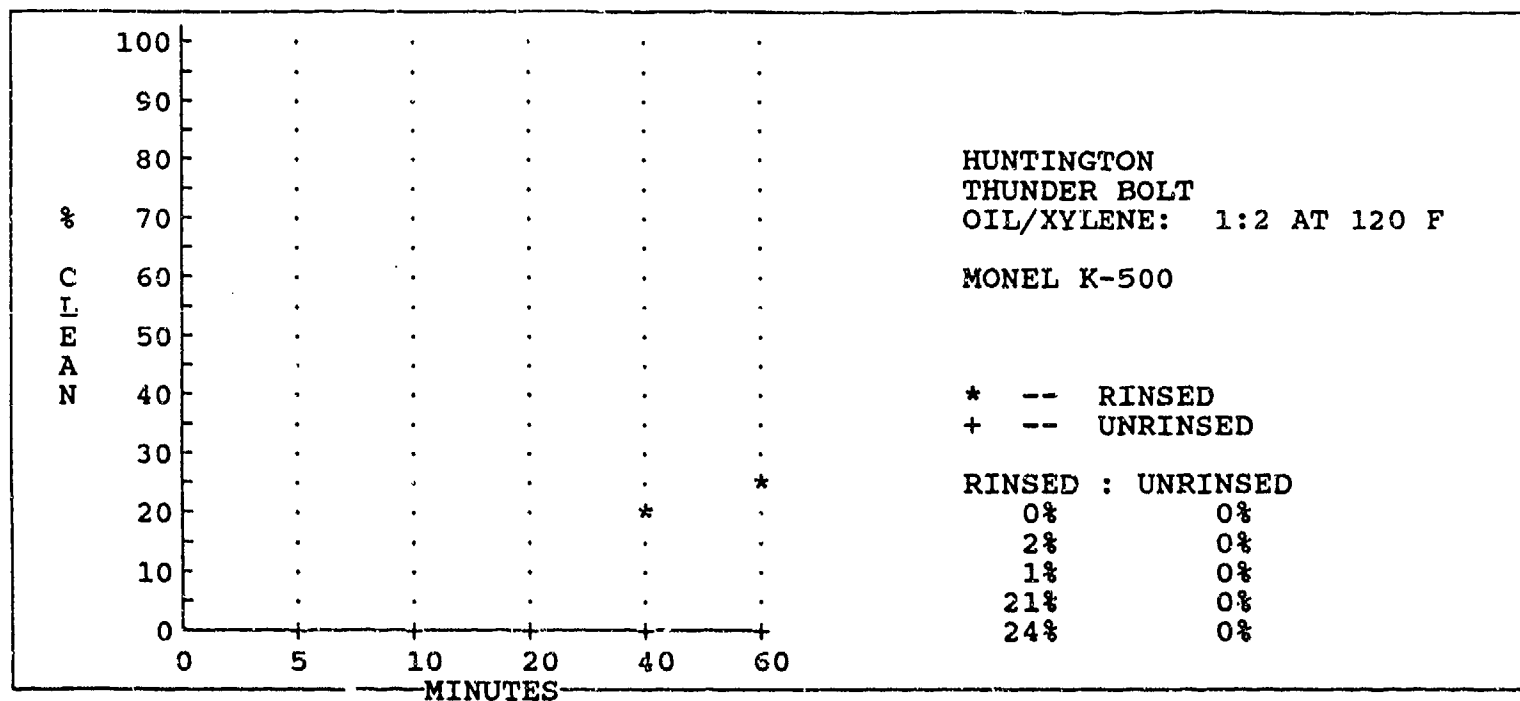
COMPANY - HUNTINGTON	732	*	*	.	.	.	*	
PRODUCT - THUNDER BOLT	695*	.	.	*	*	*	.	0- 698
TOC INIT- 44348	659	.	.	.	.	.	.	1- 719
TOC 2nd - 0	622	.	.	.	.	.	.	2- 728
COD INIT- 2125000	586	.	.	.	.	.	.	3- 713
ANILINE PT - 0.0000	549	.	.	.	.	.	.	4- 694
ATP ----- -108 E-8	512	.	.	.	.	.	.	5- 710
	476	.	.	.	.	.	.	6- 732
SOLUBILITY DATA:	439	.	.	.	.	.	.
	403	.	.	.	.	.	.	DRY
	366	.	.	.	.	.	.	WEIGHT
	329	.	.	.	.	.	.	0.0400
	293	.	.	.	.	.	.
	256	.	.	.	.	.	.
	220	.	.	.	.	.	.
	183	.	.	.	.	.	.
	146	.	.	.	.	.	.
	110	.	.	.	.	.	.
	73	.	.	.	.	.	.
	37	.	.	.	.	.	.
	0	.	.	.	.	.	.
DATE - 06/21/88	COD vs TIME	0	1	2	3	4	5	6

PHENOL	261	*	.	.	.	.	.
06/21/88	248*	.	.	.	.	.	.	0- 254
ATP - -42 E-8	235	.	.	.	.	.	.	1- 261
	222	.	*	*	*	.	.	2- 220
	209	.	.	.	.	*	.	3- 216
	196	.	.	.	.	.	*	4- 224
HUNTINGTON	183	.	.	.	.	.	.	5- 204
LHTS	170	.	.	.	.	.	.	6- 199
	157	.	.	.	.	.	.
HUNTINGTON	144	.	.	.	.	.	.	DRY
THUNDER BOLT	131	.	.	.	.	.	.	WEIGHT
	117	.	.	.	.	.	.	0.0400
JOHNSON WAX/GEM STATE PAP	104	.	.	.	.	.	.
BIG BARE	91	.	.	.	.	.	.
	78	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	65	.	.	.	.	.	.
J-SHOP 500	52	.	.	.	.	.	.
	39	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	26	.	.	.	.	.	.
J-SHOP 600	13	.	.	.	.	.	.
	0	.	.	.	.	.	.
DATE - 06/21/88	COD vs TIME	0	1	2	3	4	5	6







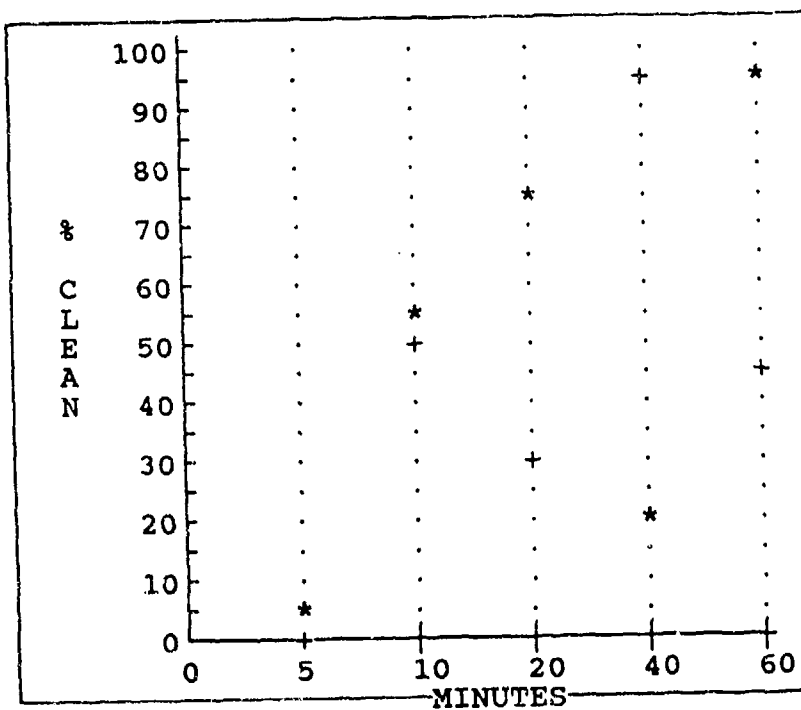


COMPANY -	HYDRITE CHEMICAL C	1650*	.	.	.	.	.	.	0-	1650
PRODUCT -	HYDRI-CLEAN NPX	1568	.	.	.	.	.	.	1-	1044
TOC INIT-	2991601	1485	.	.	.	.	.	.	2-	1032
TOC 2nd -	101	1403	.	.	.	.	.	.	3-	1120
COD INIT-	525000	1320	.	.	.	.	.	.	4-	1048
ANILINE PT -	0.0000	1238	.	.	.	.	.	.	5-	1090
ATP -----	12 E-8	1155	.	.	*	.	.	*	6-	1119
		1073	*	*	.	*	*	.		
SOLUBILITY DATA:		990	.	.	.	.	.	.
1:1 @ 100	20%	908	.	.	.	.	.	.	DRY	
1:1 @ 130	87%	825	.	.	.	.	.	.	WEIGHT	
		743	.	.	.	.	.	.	0.0594	
		660	.	.	.	.	.	.
		578	.	.	.	.	.	.
		495	.	.	.	.	.	.
		413	.	.	.	.	.	.
		330	.	.	.	.	.	.
		248	.	.	.	.	.	.
		165	.	.	.	.	.	.
		83	.	.	.	.	.	.
		0	.	.	.	.	.	.

DATE - 03/16/88 COD vs TIME 0 1 2 3 4 5 6

PHENOL	342*	.	.	.	.	.	.	.	0-	342
03/16/88	325	.	.	.	.	.	.	.	1-	242
ATP - 758 E-8	308	.	.	.	.	.	.	.	2-	252
	291	.	.	.	.	.	.	.	3-	146
	274	.	.	.	.	.	.	.	4-	110
	257	.	*	.	.	.	.	.	5-	38
DOBER CHEMICAL CORP.	239	*	.	.	.	.	.	.	6-	11
8679	222	.	.	.	.	.	.	.
	205	.	.	.	.	.	.	.
HOMESTEAD INDUSTRIES INC.	188	.	.	.	.	.	.	.	DRY	
#49	171	.	.	.	.	.	.	.	WEIGHT	
	154	.	.	*	.	.	.	.	0.0594	
HOMESTEAD INDUSTRIES INC.	137	.	.	.	.	.	.	.
#65	120	.	.	.	.	.	.	.
	103	.	.	.	*	.	.	.		
HUNTINGTON	86	.	.	.	.	.	.	.
J8-10P	68	.	.	.	.	.	.	.
	51	.	.	.	.	.	.	.
HYDRITE CHEMICAL CO.	34	.	.	.	.	*	.	.
HYDRI-CLEAN NPX	17	.	.	.	.	.	.	*
	0	.	.	.	.	.	.	.

DATE - 03/16/88 COD vs TIME 0 1 2 3 4 5 6



HYDRITE CHEMICAL CO.
HYDRI-CLEAN NPX
1:1 AT 130 F

A12024

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED

4%	1%
58%	50%
77%	28%
21%	93%
93%	47%

COMPANY - HYLUBE INC.	511	.	*	.	.	.	.
PRODUCT - ALKAKLEEN 658	485	*	.	.	*	.	.	0- 414
TOC INIT- 43935	460	.	.	*	.	*	*	1- 494
TOC 2nd - 0	434	.	.	.	.	.	.	2- 511
COD INIT- 113500	409*	.	.	.	.	.	.	3- 457
ANILINE PT - 0.0000	383	.	.	.	.	.	.	4- 474
ATP ----- -8 E-8	358	.	.	.	.	.	.	5- 454
	332	.	.	.	.	.	.	6- 468

SOLUBILITY DATA:

	307	.	.	.	.	.	.
	281	.	.	.	.	.	.	DRY
	256	.	.	.	.	.	.	WEIGHT
	230	.	.	.	.	.	.	0.0545
	204	.	.	.	.	.	.
	179	.	.	.	.	.	.
	153	.	.	.	.	.	.
	128	.	.	.	.	.	.
	102	.	.	.	.	.	.
	77	.	.	.	.	.	.
	51	.	.	.	.	.	.
	26	.	.	.	.	.	.
	0	.	.	.	.	.	.

DATE - 06/14/88 COD vs TIME 0 1 2 3 4 5 6

PHENOL
06/14/88
ATP - 91 E-8

BIO-TEK INC.
122 QUIK

BIO-TEK INC.
126 SONI-CLEAN

BRULIN
FORMULA 512M

BUILD ALL
BAC #137

HYLUBE INC.
ALKAKLEEN 658

	308	*	.	.	.	.	.
	293*	.	.	.	.	.	.	0- 290
	277	.	.	.	.	.	.	1- 308
	262	.	.	.	.	.	.	2- 156
	246	.	.	.	.	.	.	3- 70
	231	.	.	.	.	.	.	4- 9
	216	.	.	.	.	.	.	5- 10
	200	.	.	.	.	.	.	6- 31
	185	.	.	.	.	.	.
	169	.	.	.	.	.	.	DRY
	154	.	*	.	.	.	.	WEIGHT
	139	.	.	.	.	.	.	0.0545
	123	.	.	.	.	.	.
	108	.	.	.	.	.	.
	92	.	.	.	.	.	.
	77	.	.	*	.	.	.	
	62	.	.	.	.	.	.
	46	.	.	.	.	.	.
	31	.	.	.	.	.	*
	15	.	.	.	*	*	.	
	0	.	.	.	.	.	.

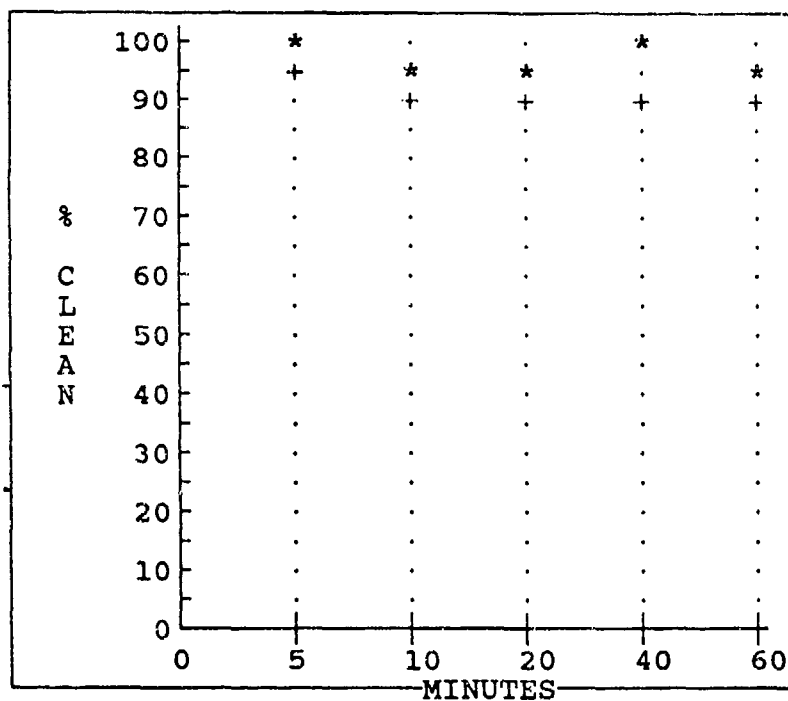
DATE - 06/14/88 COD vs TIME 0 1 2 3 4 5 6

COMPANY - HYLUBE INC.	584*	.	.	.	.	.	*
PRODUCT - HYKLEEN 300	555	.	.	.	.	.	.	0- 584
TOC INIT- 57283	526	.	.	.	*	.	.	1- 62
TOC 2nd - 0	496	.	*	.	.	*	.	2- 510
COD INIT- 250000	467	.	.	*	.	.	.	3- 480
ANILINE PT - 0.0000	438	.	.	.	.	.	.	4- 538
ATP ----- 17 E-8	409	.	.	.	.	.	.	5- 508
	380	.	.	.	.	.	.	6- 573
SOLUBILITY DATA:	350	.	.	.	.	.	.
CONCENT @ AMBIE 0%	321	.	.	.	.	.	.	DRY
1:4 @ AMBIE 0%	292	.	.	.	.	.	.	WEIGHT
CONCENT @ 140 0%	263	.	.	.	.	.	.	0.0610
	234	.	.	.	.	.	.
	204	.	.	.	.	.	.
	175	.	.	.	.	.	.
	146	.	.	.	.	.	.
	117	.	.	.	.	.	.
	88	.	.	.	.	.	.
	58	*	.	.	.	.	.
	29	.	.	.	.	.	.
	0	.	.	.	.	.	.

DATE - 03/17/88 COD vs TIME 0 1 2 3 4 5 6

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PHENOL 03/17/88 ATP - 60 E-8 </div>	292*	.	.	.	.	.	.	0- 292
	277	.	.	.	.	.	.	1- 195
	263	.	.	.	.	.	.	2- 135
	248	.	.	.	.	.	.	3- 46
	234	.	.	.	.	.	.	4- 76
	219	.	.	.	.	.	.	5- 140
HYLUBE INC.	204	.	.	.	.	.	.	6- 32
HYKLEEN 300	190	*	.	.	.	.	.
	175	.	.	.	.	.	.
INTERNATIONAL PRODUCTS CO	161	.	.	.	.	.	.	DRY
MICRO	146	.	.	.	.	*	.	WEIGHT
	131	.	*	.	.	.	.	0.0610
ORANGE-SOL INCORPERATED	117	.	.	.	.	.	.
DE-SOLV-IT	102	.	.	.	.	.	.
	88	.	.	.	.	.	.
PACIFIC CHEMICAL	73	.	.	.	*	.	.	
RIDDALL	58	.	.	.	.	.	.
	44	.	.	*	.	.	.	
PANTHER CHEMICAL CO.	29	.	.	.	.	.	*
759	15	.	.	.	.	.	.
	0	.	.	.	.	.	.

DATE - 03/17/88 COD vs TIME 0 1 2 3 4 5 6



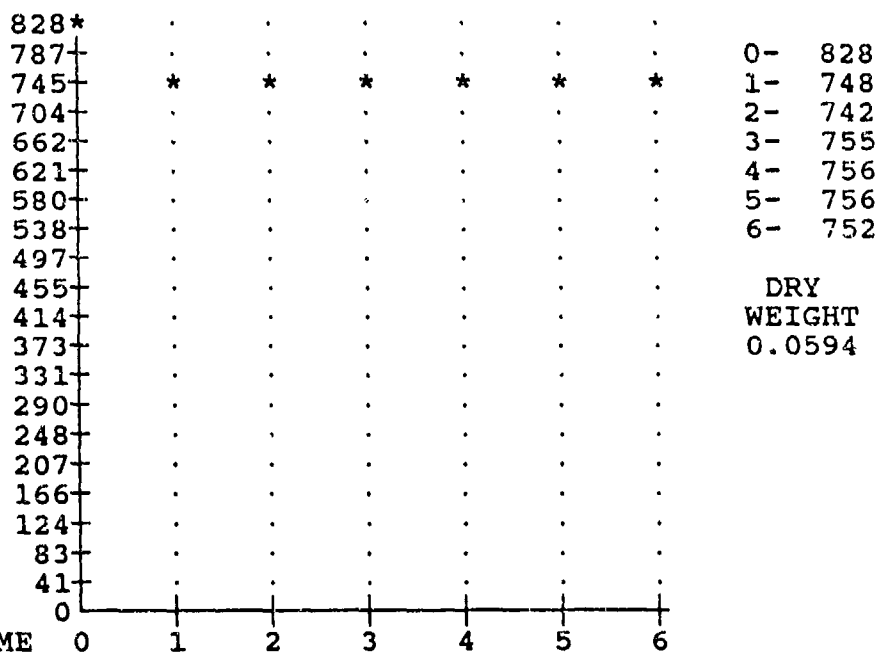
HYLUBE INC.
HYKLEEN 300
GREASE: CONCENTRATE AT A
MBIENT
MONEL K-500

* -- RINSED
+ -- UNRINSED

RINSED	:	UNRINSED
100%		93%
96%		92%
97%		92%
100%		88%
97%		91%

COMPANY - HYLUBE INC.
 PRODUCT - HYKLEEN 312
 TOC INIT- 0
 TOC 2nd - 0
 COD INIT- 342500
 ANILINE PT - 0.0000
 ATP ----- 38 E-8

SOLUBILITY DATA:



DRY
 WEIGHT
 0.0594

DATE - 06/28/88

COD vs TIME

0 1 2 3 4 5 6

PHENOL
 06/28/88
 ATP - 72 E-8

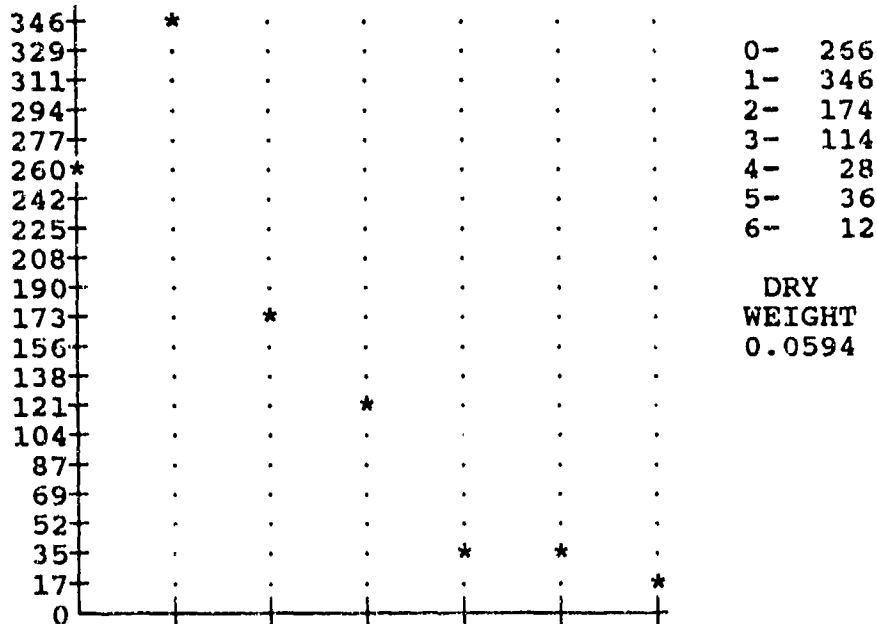
HYLUBE INC.
 HYKLEEN 312

LEA MANUFACTURING CO.
 CLEANOL

MEQQEM
 MEQQEM-CLEAN 8512

MEQQEM
 MEQQEM-CLEAN 8516

PACIFIC CHEMICAL
 B-82

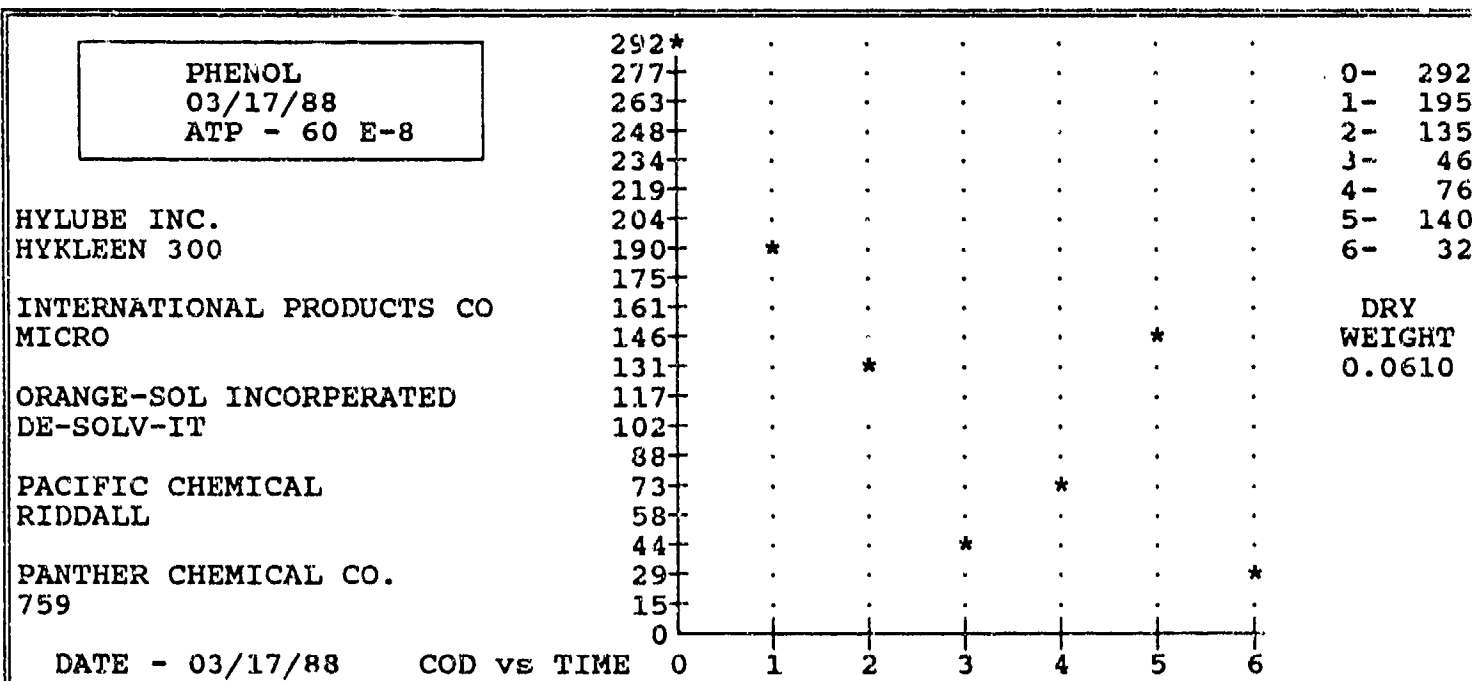
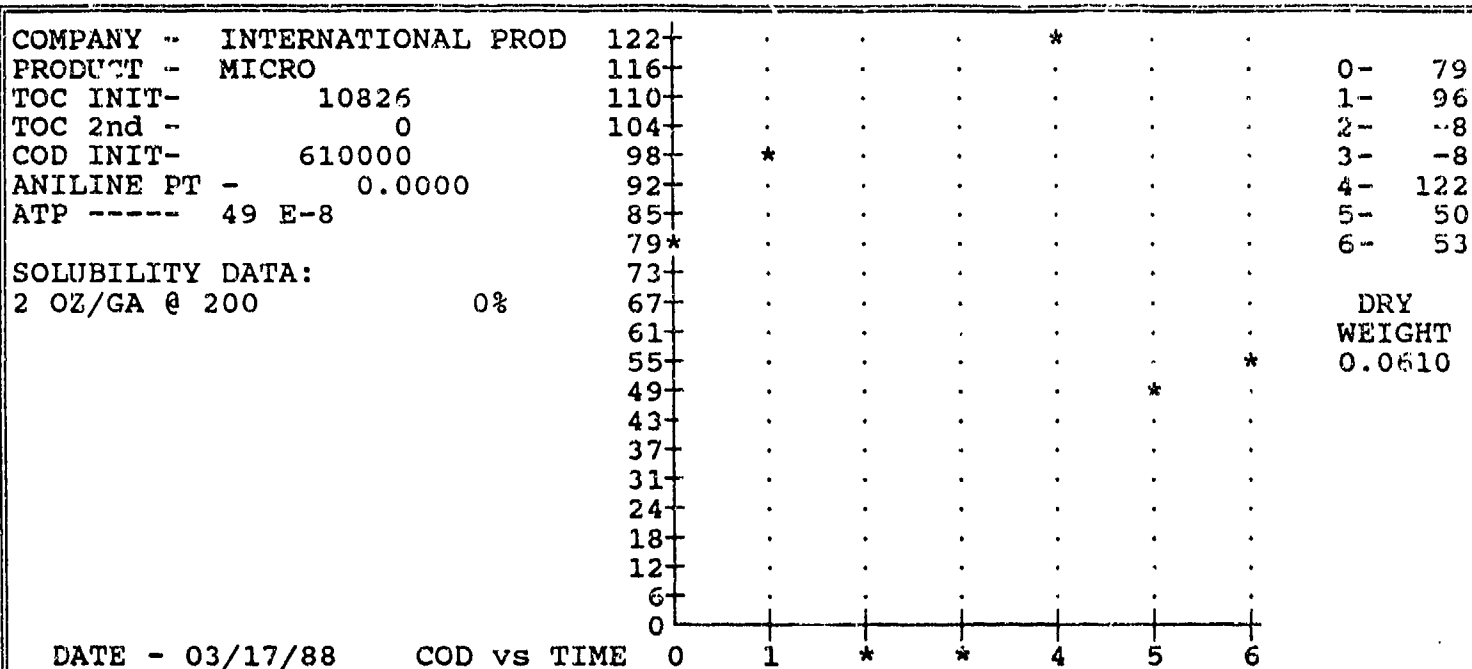


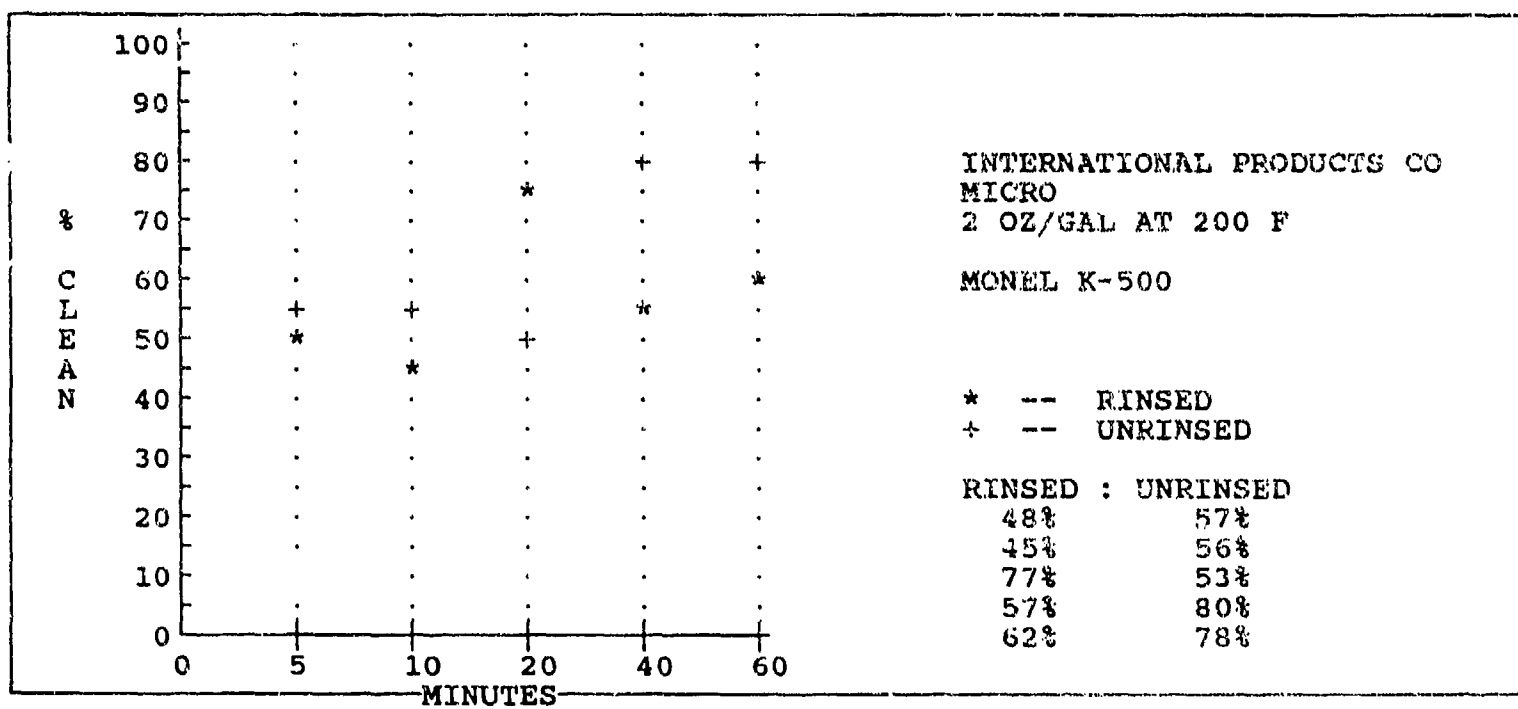
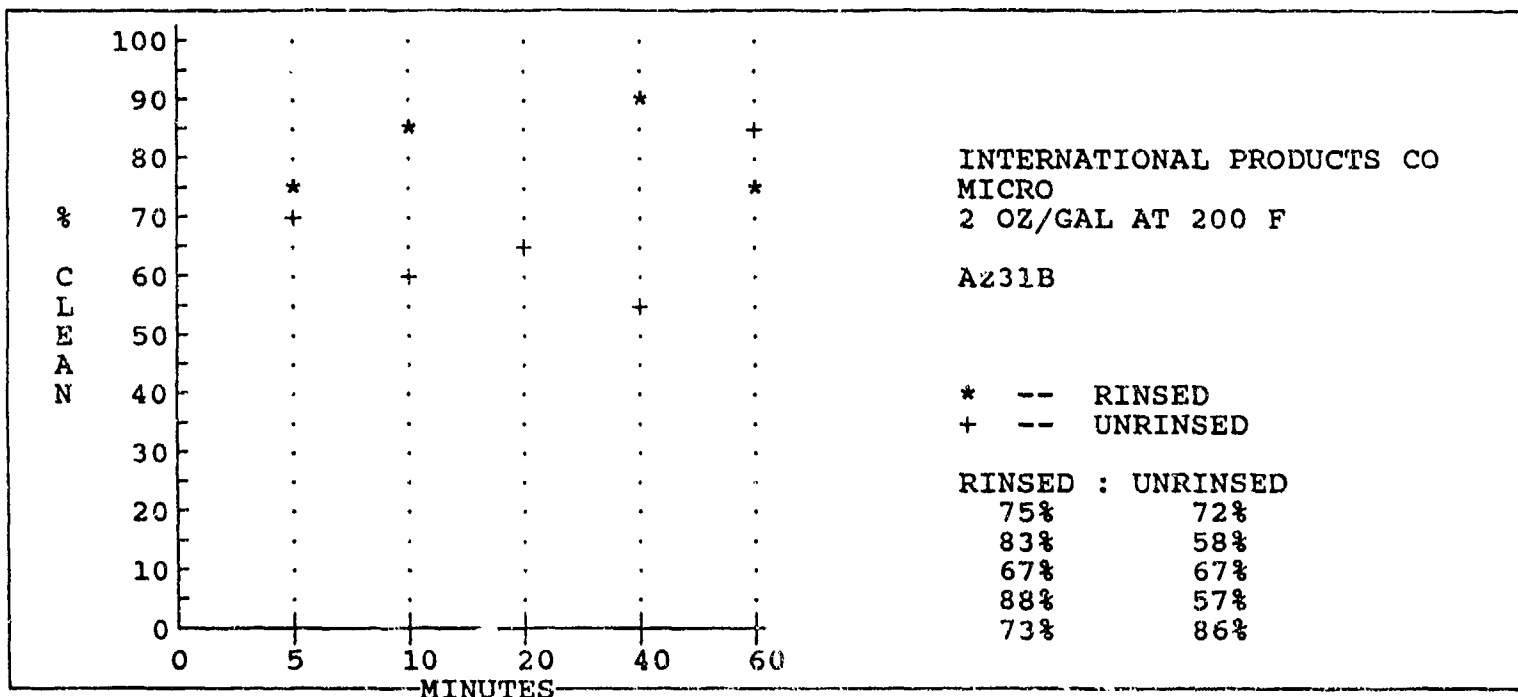
DRY
 WEIGHT
 0.0594

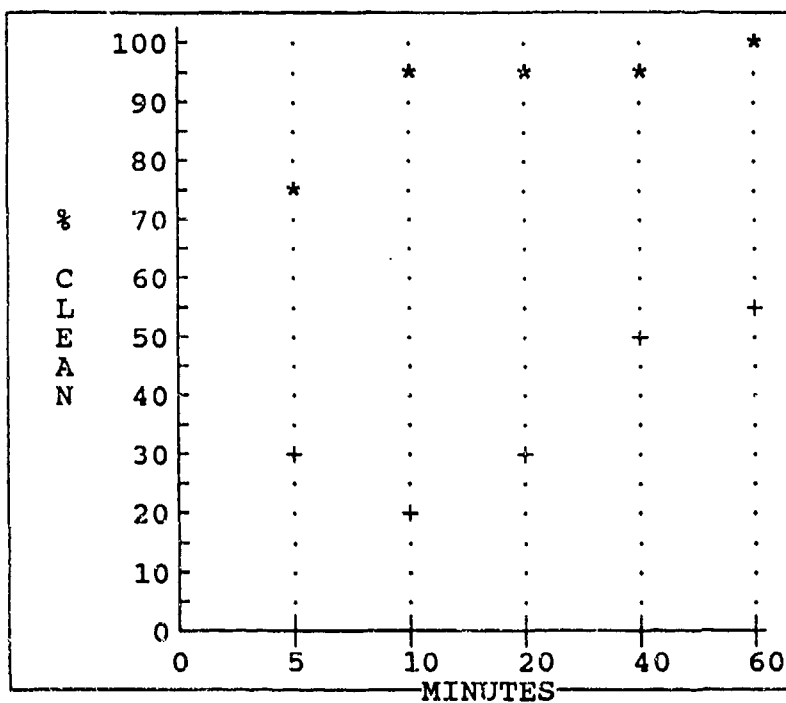
DATE - 06/28/88

COD vs TIME

0 1 2 3 4 5 6



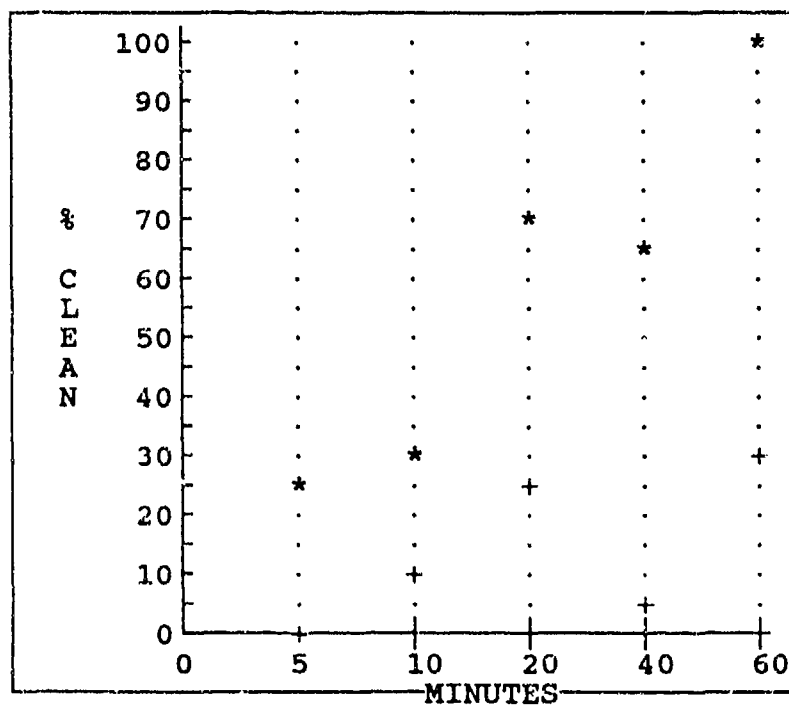




INTERNATIONAL PRODUCTS CO
MICRO
GREASE: 2 OZ/GAL AT 200
F
INCONEL 750

* -- RINSED
+ -- UNRINSED

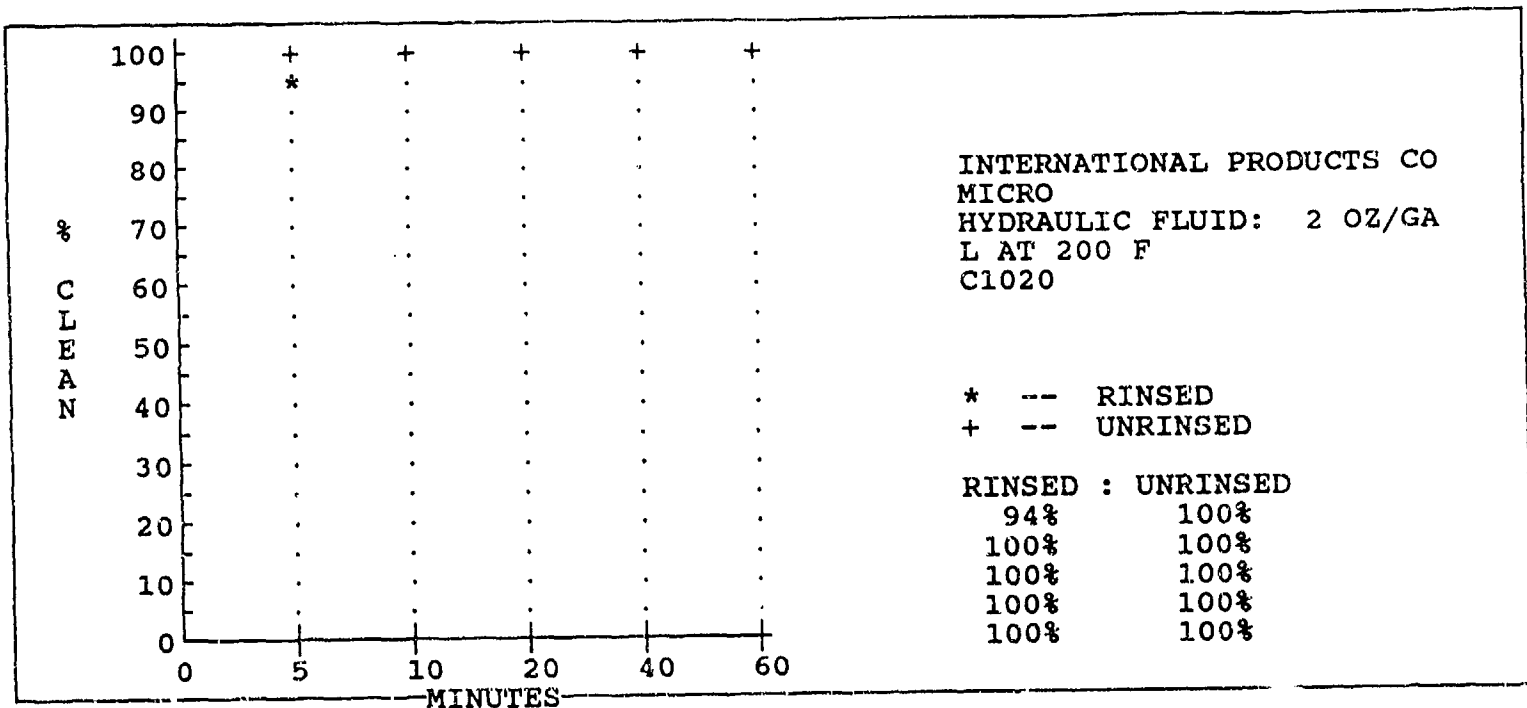
RINSED : UNRINSED	
73%	28%
95%	22%
96%	29%
98%	51%
100%	54%



INTERNATIONAL PRODUCTS CO
MICRO
OIL/XYLENE: 19 OZ/GAL AT
200 F
MONEL K-500

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED	
23%	0%
28%	12%
71%	25%
64%	4%
100%	32%

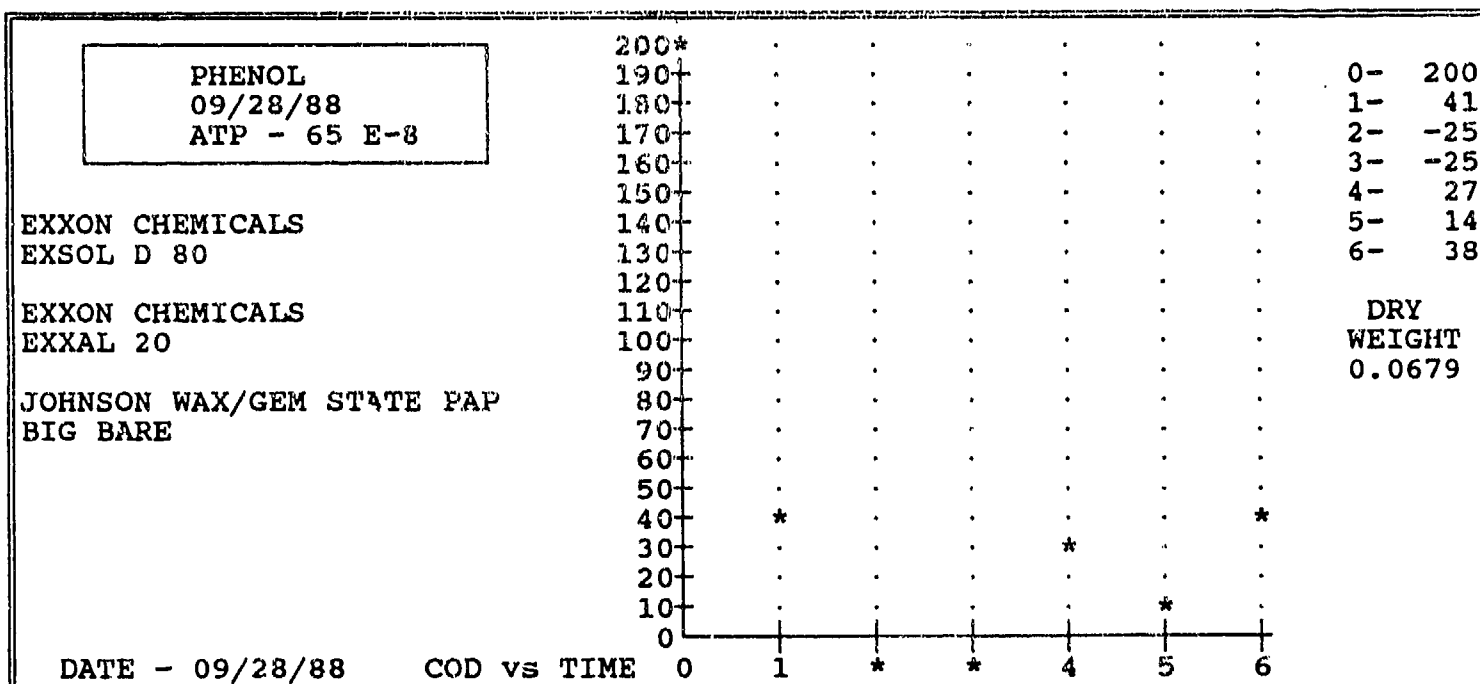
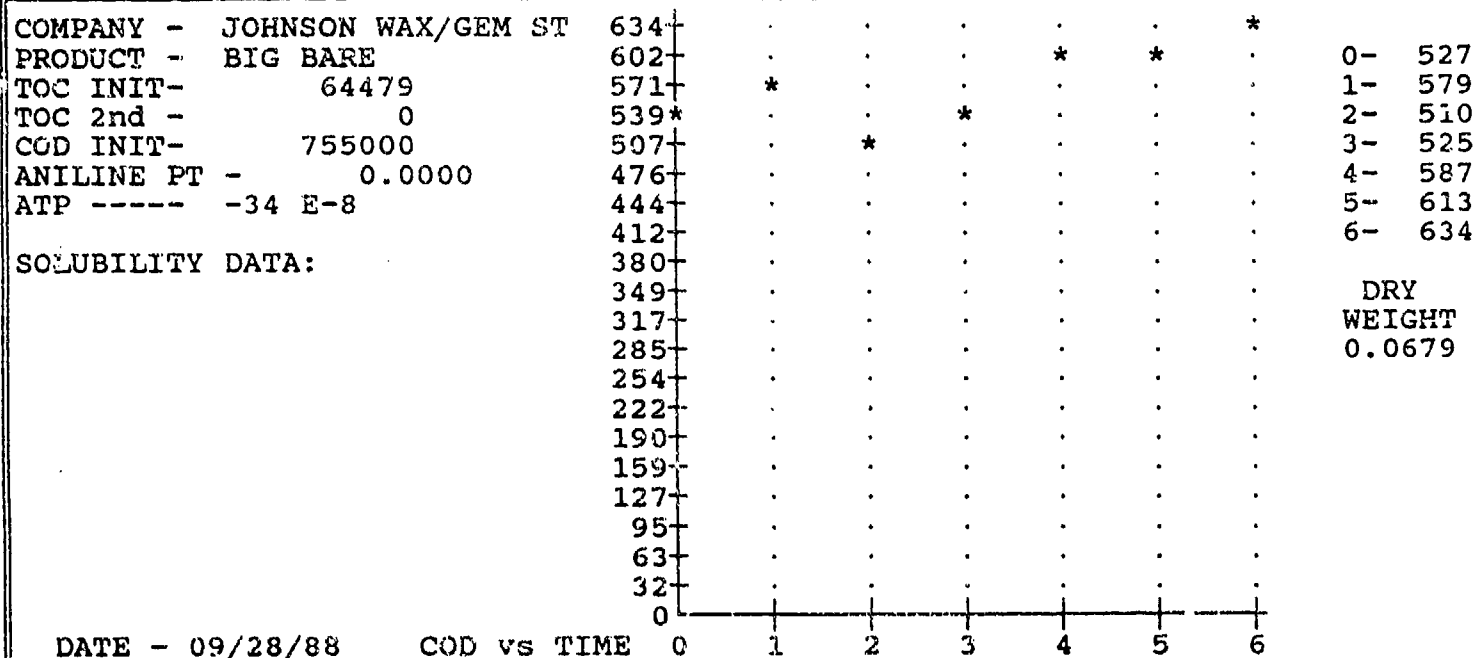


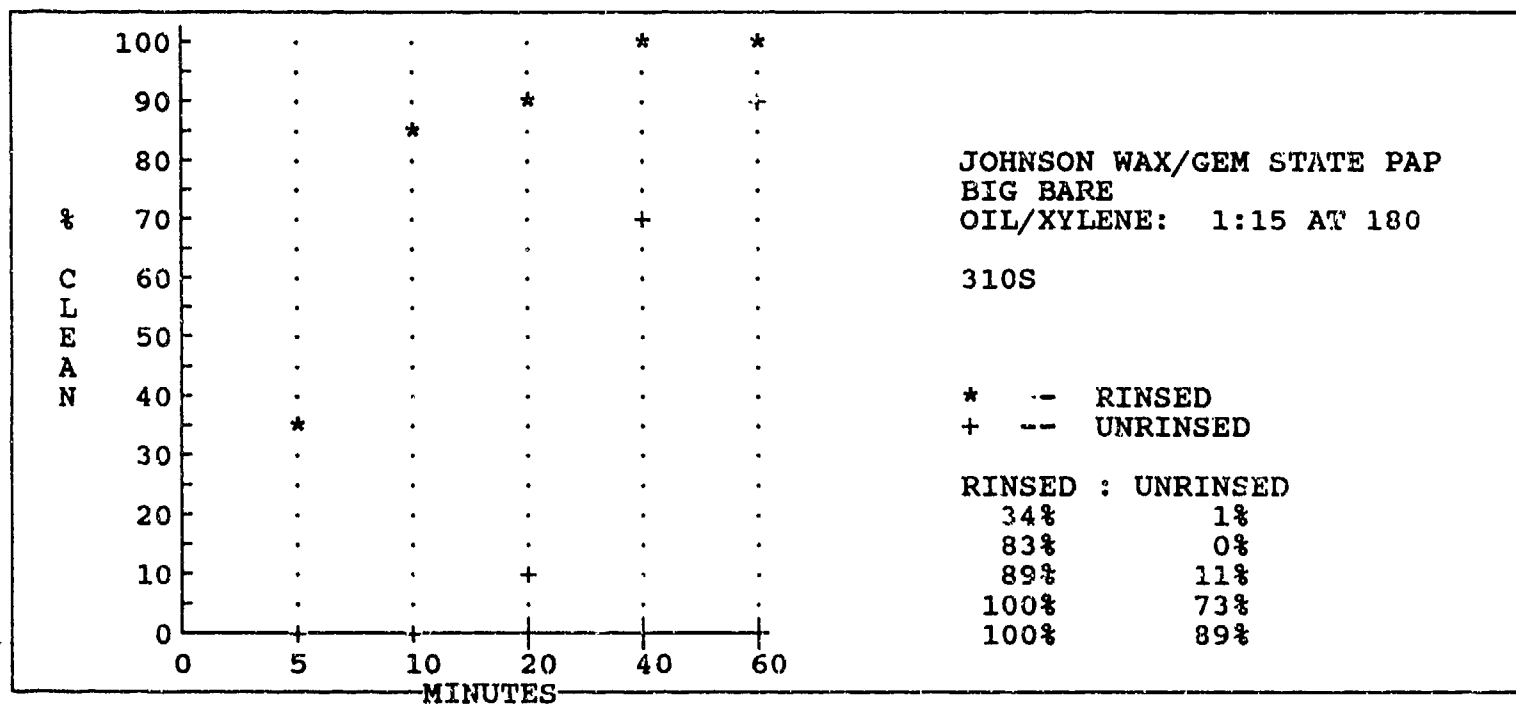
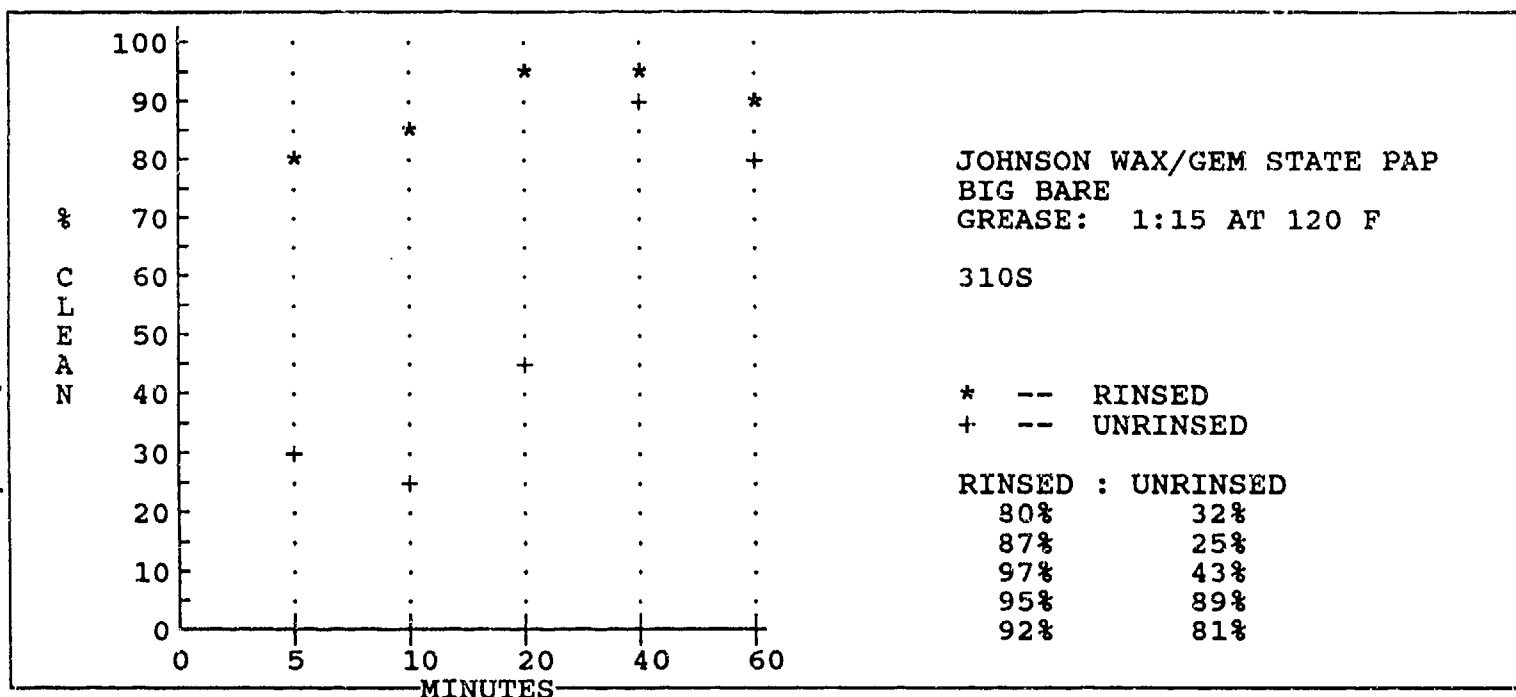
COMPANY - JOHNSON WAX/GEM ST	422	*	.	.	.	*	*	
PRODUCT - BIG BARE	401	.	*	*	*	.	.	0- 376
TOC INIT- 64479	380*	.	.	.	.	.	.	1- 414
TOC 2nd - 0	359	.	.	.	.	.	.	2- 402
COD INIT- 755000	338	.	.	.	.	.	.	3- 400
ANILINE PT - 0.0000	317	.	.	.	.	.	.	4- 406
ATP ----- -91 E-8	295	.	.	.	.	.	.	5- 422
	274	.	.	.	.	.	.	6- 414
SOLUBILITY DATA:	253	.	.	.	.	.	.
	232	.	.	.	.	.	.	DRY
	211	.	.	.	.	.	.	WEIGHT
	190	.	.	.	.	.	.	0.0400
	169	.	.	.	.	.	.
	148	.	.	.	.	.	.
	127	.	.	.	.	.	.
	106	.	.	.	.	.	.
	84	.	.	.	.	.	.
	63	.	.	.	.	.	.
	42	.	.	.	.	.	.
	21	.	.	.	.	.	.
	0	.	.	.	.	.	.

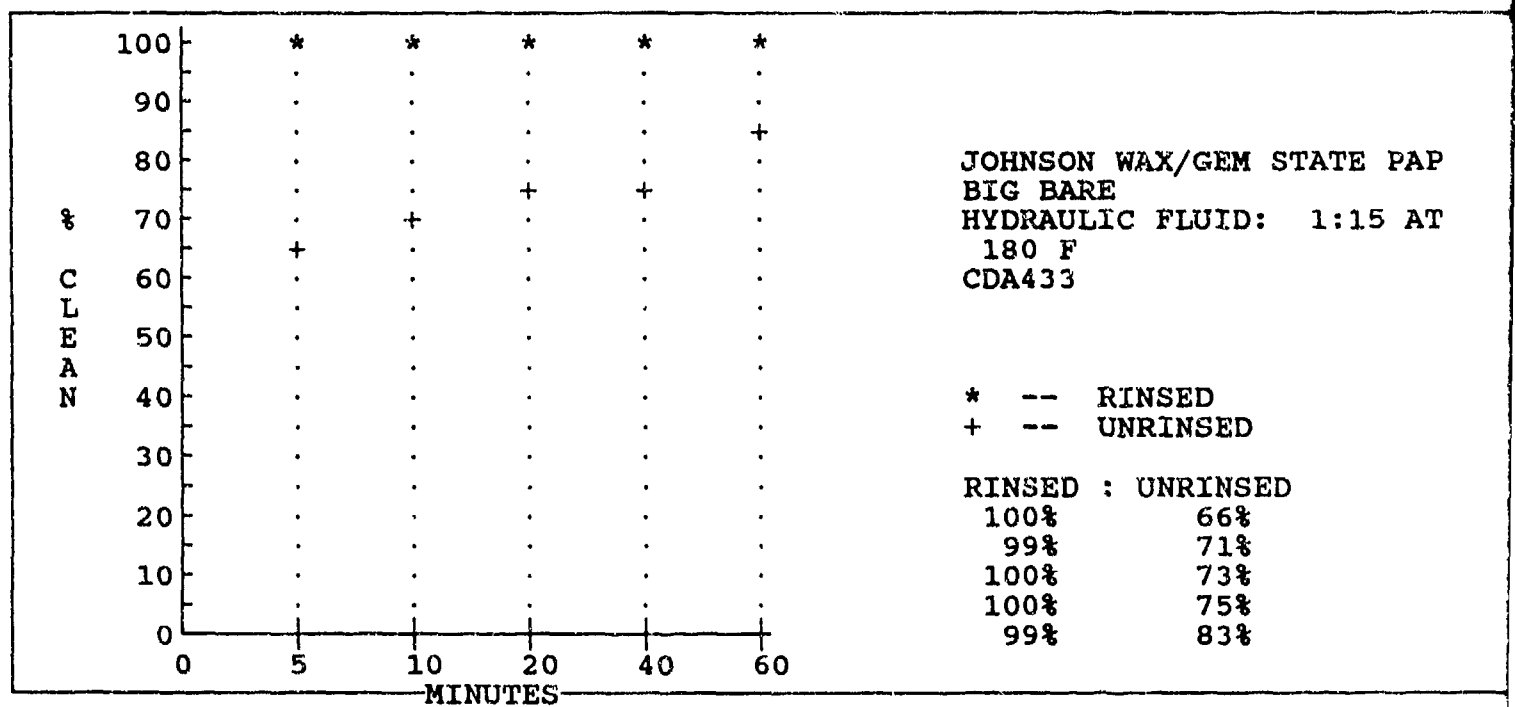
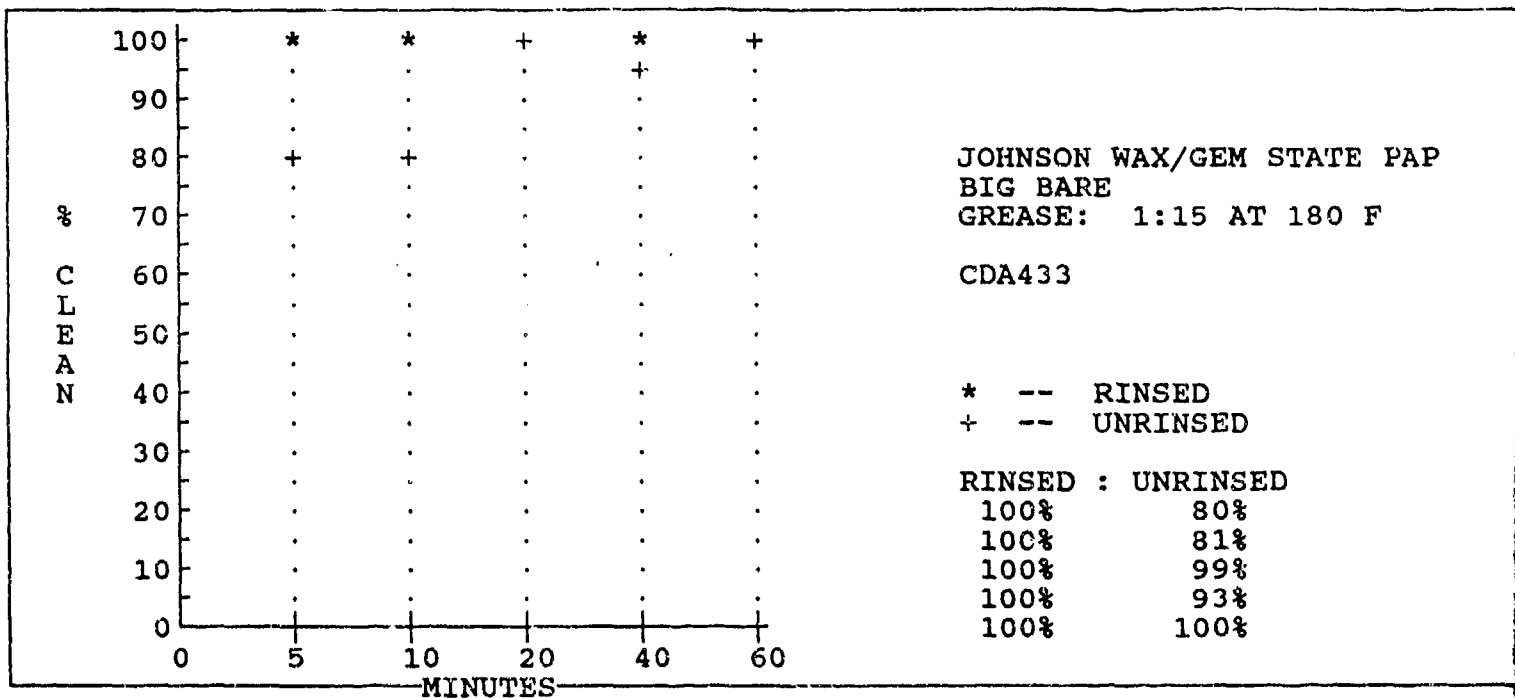
DATE - 06/21/88 COD vs TIME 0 1 2 3 4 5 6

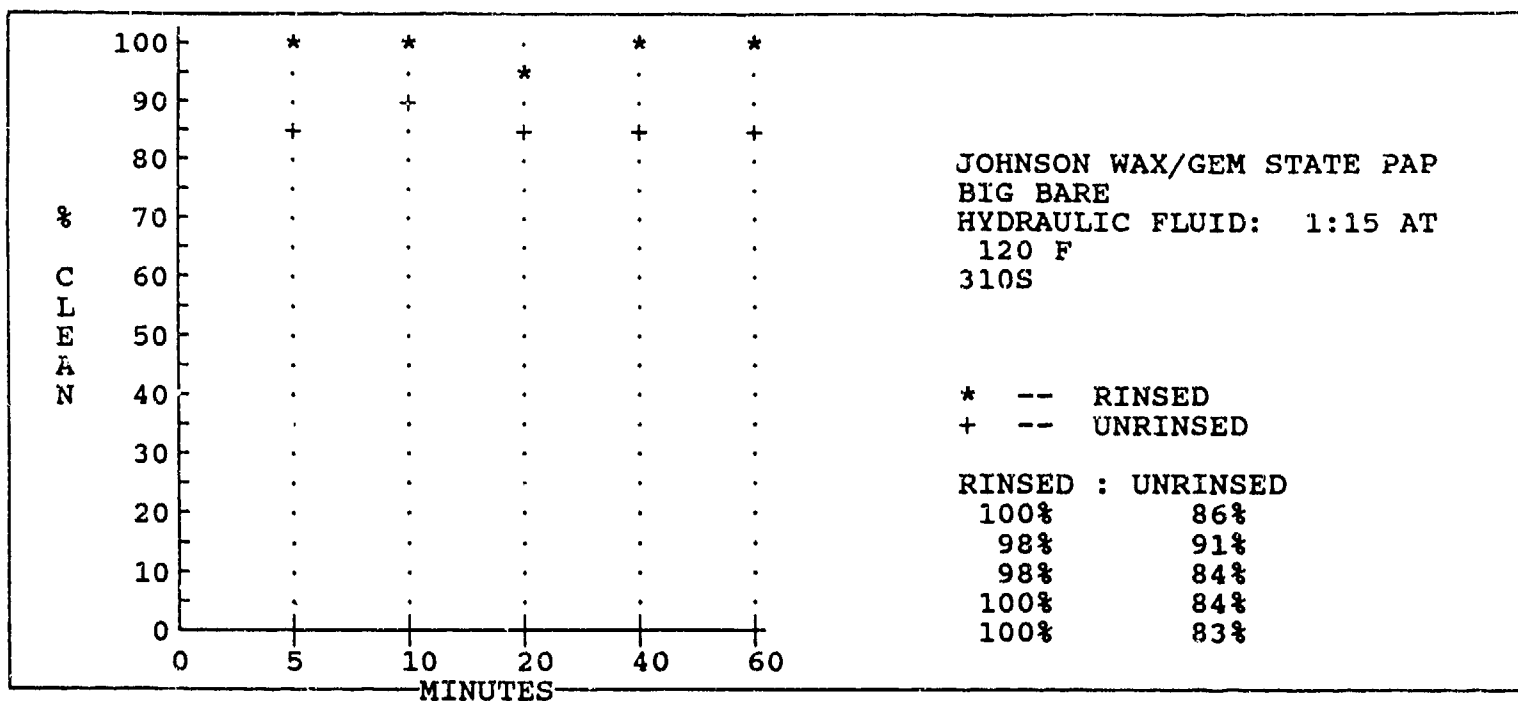
PHENOL	261	*	.	.	.	.	.
06/21/88	248*	.	.	.	.	.	.	0- 254
ATP - -42 E-8	235	.	.	.	.	.	.	1- 261
	222	.	*	*	*	.	.	2- 220
	209	.	.	.	.	*	.	3- 216
	196	.	.	.	.	.	*	4- 224
HUNTINGTON	183	.	.	.	.	.	.	5- 204
LHTS	170	.	.	.	.	.	.	6- 199
	157	.	.	.	.	.	.
HUNTINGTON	144	.	.	.	.	.	.	DRY
THUNDER BOLT	131	.	.	.	.	.	.	WEIGHT
	117	.	.	.	.	.	.	0.0400
JOHNSON WAX/GEM STATE PAP	104	.	.	.	.	.	.
BIG BARE	91	.	.	.	.	.	.
	78	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	65	.	.	.	.	.	.
J-SHOP 500	52	.	.	.	.	.	.
	39	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	26	.	.	.	.	.	.
J-SHOP 600	13	.	.	.	.	.	.
	0	.	.	.	.	.	.

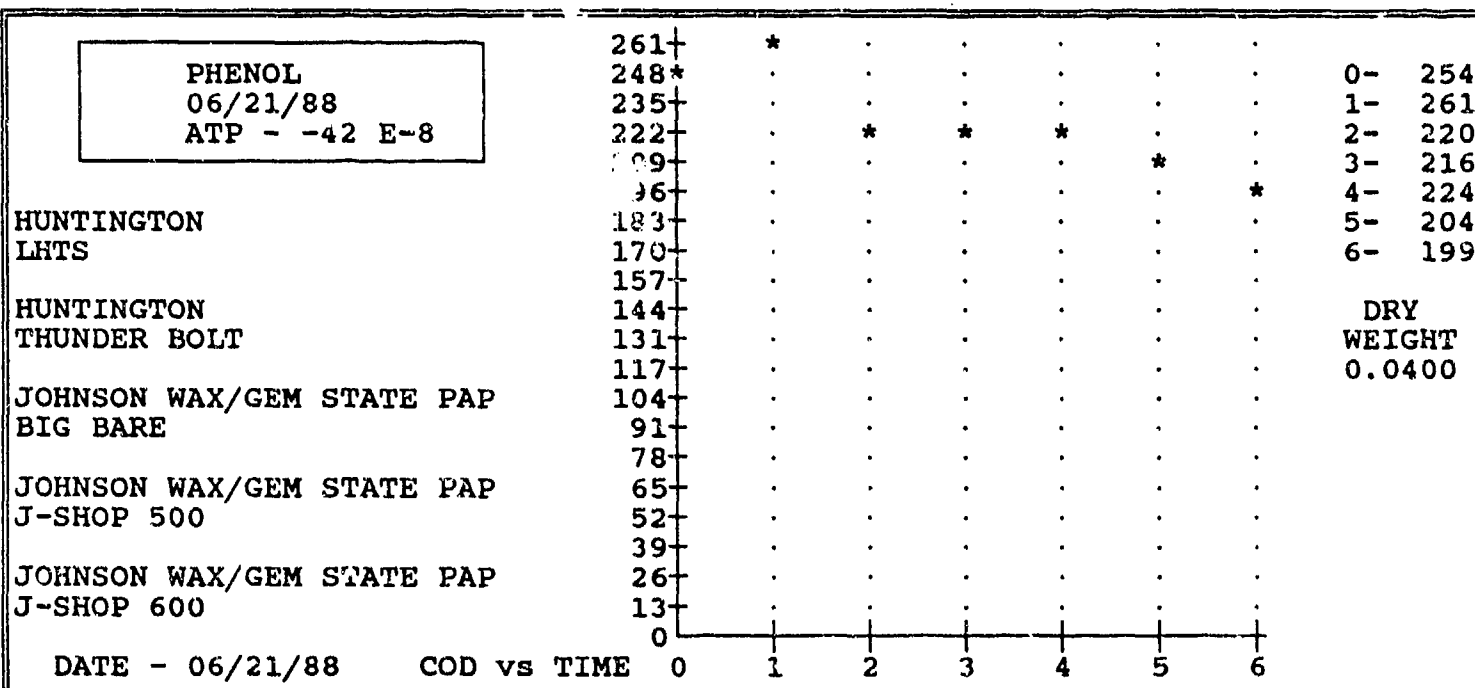
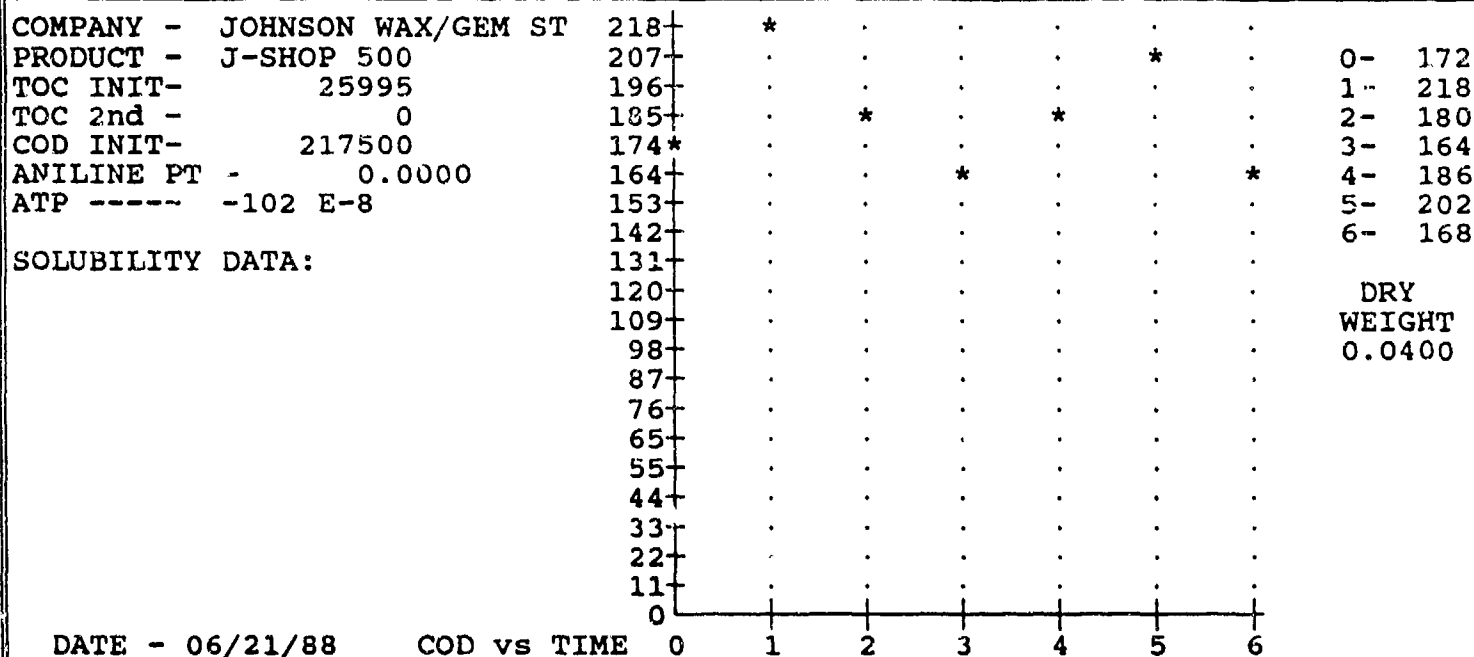
DATE - 06/21/88 COD vs TIME 0 1 2 3 4 5 6

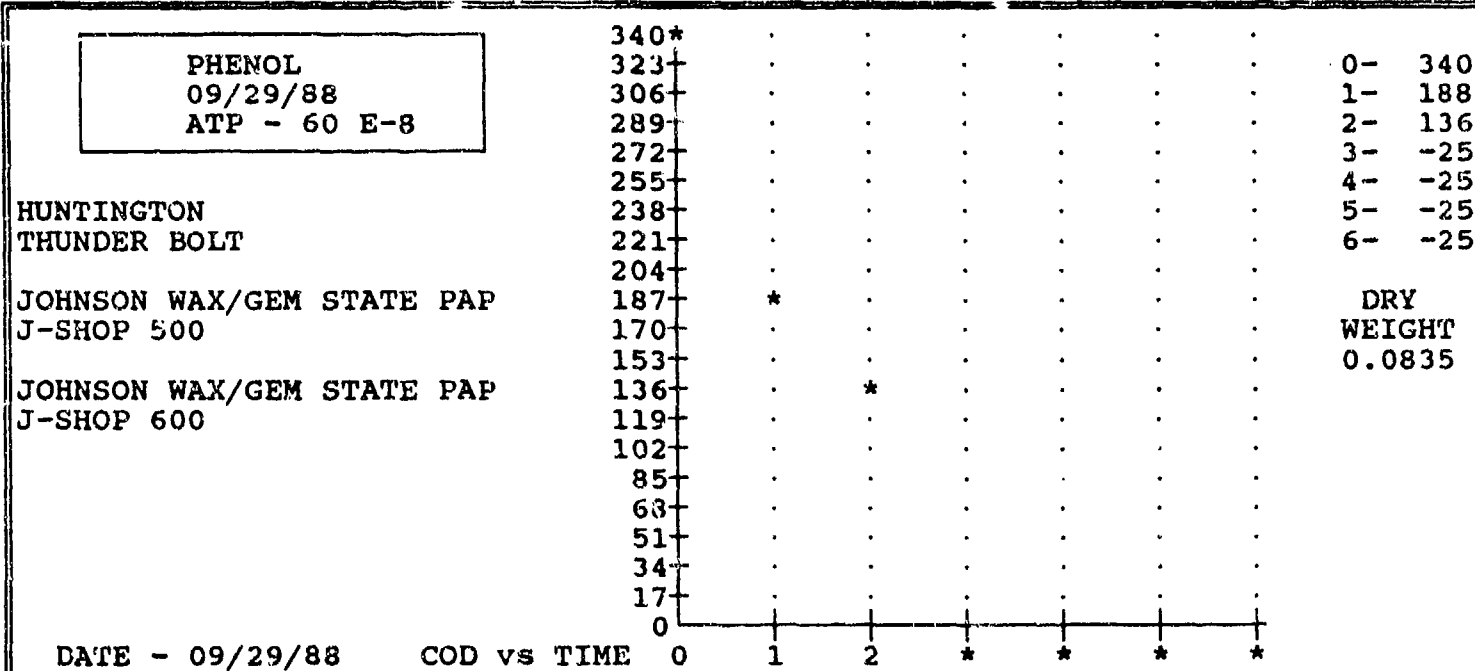
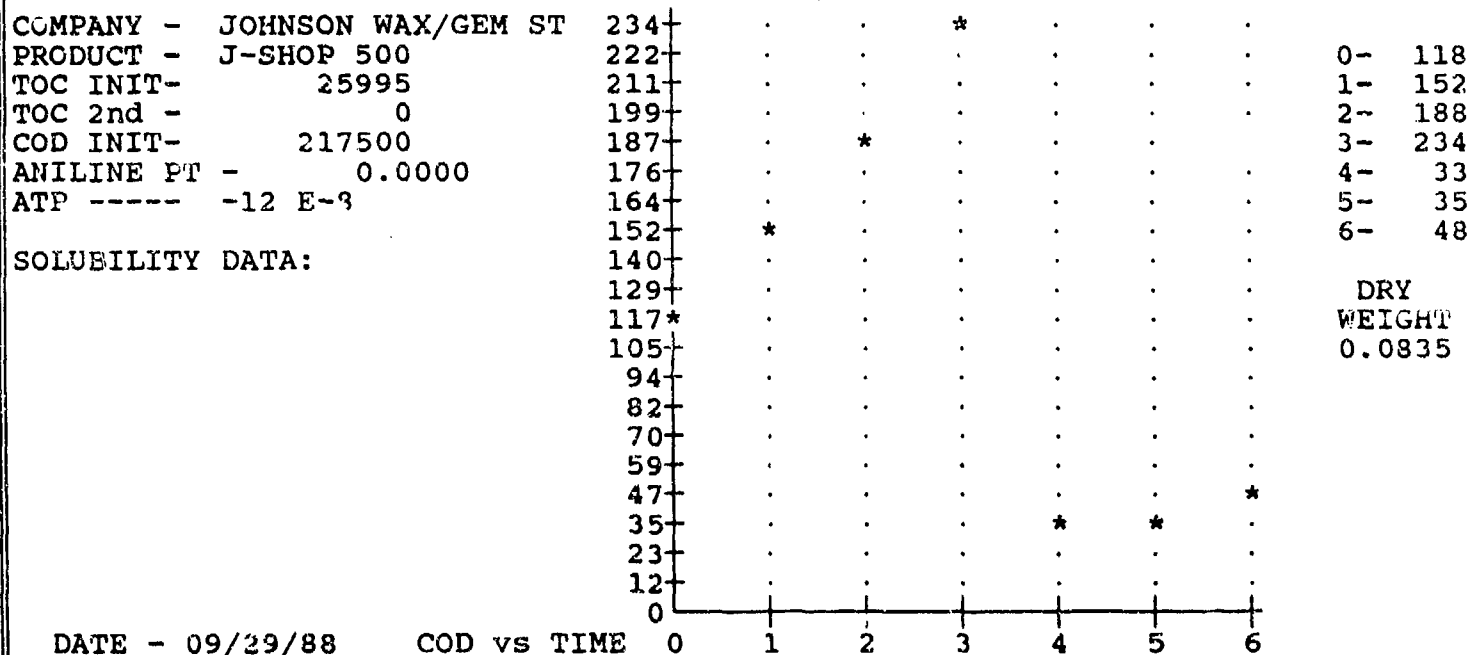


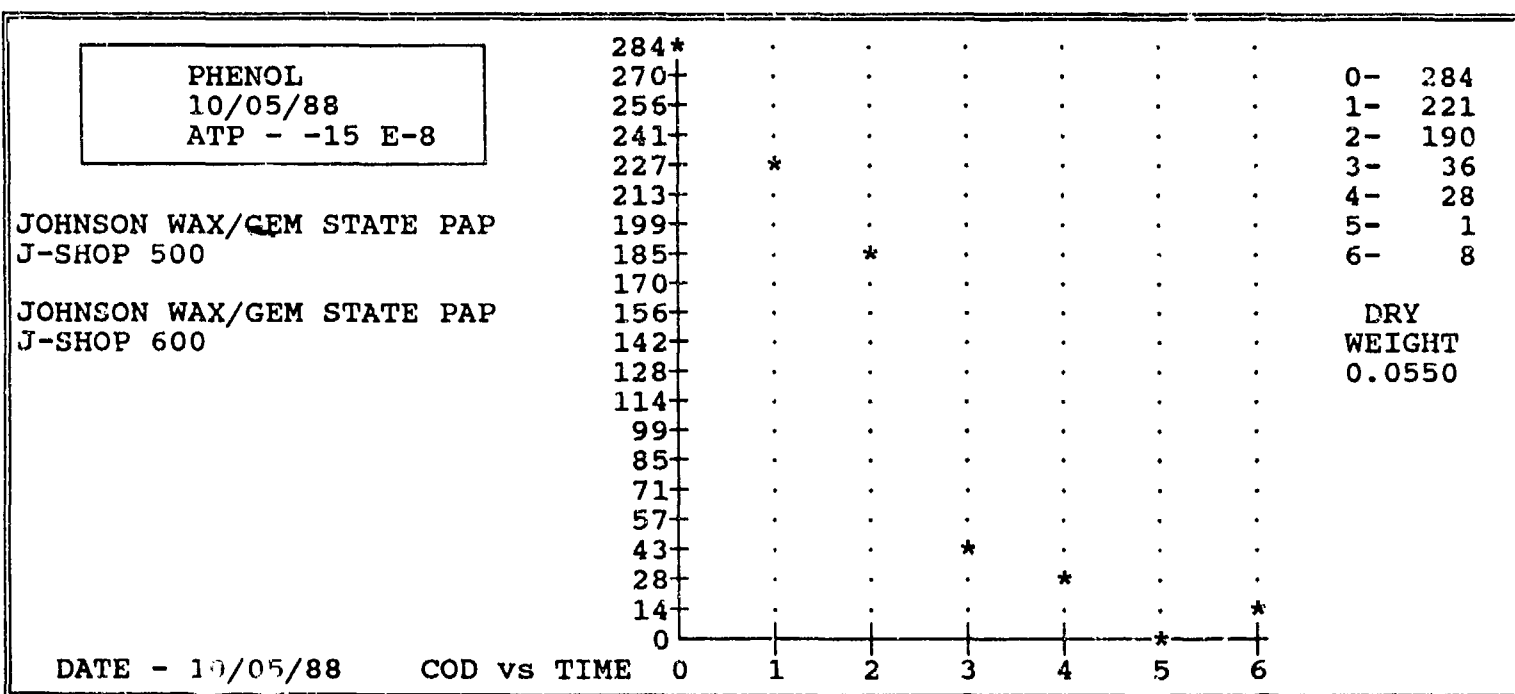
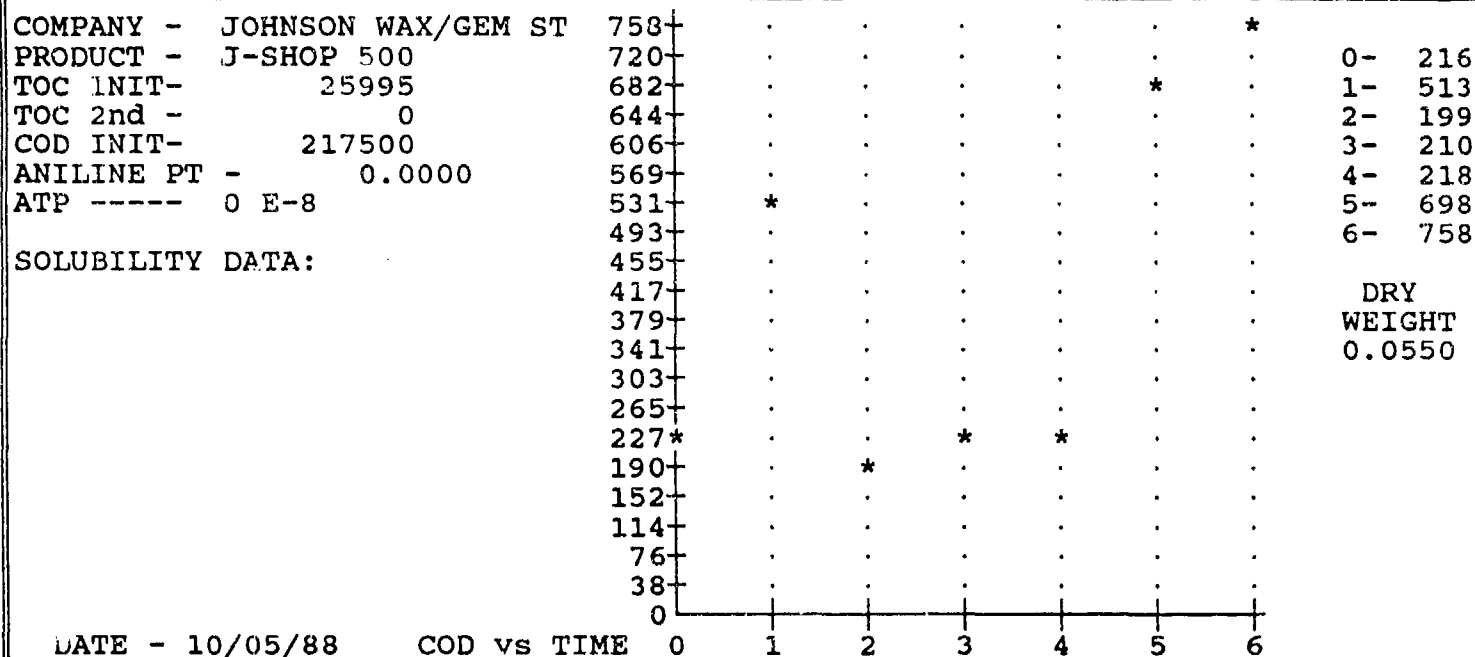


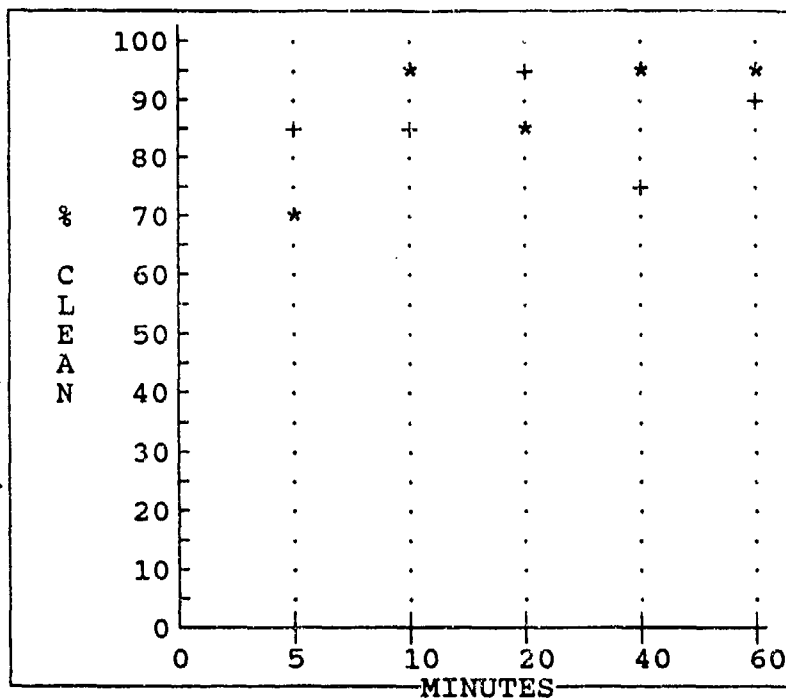










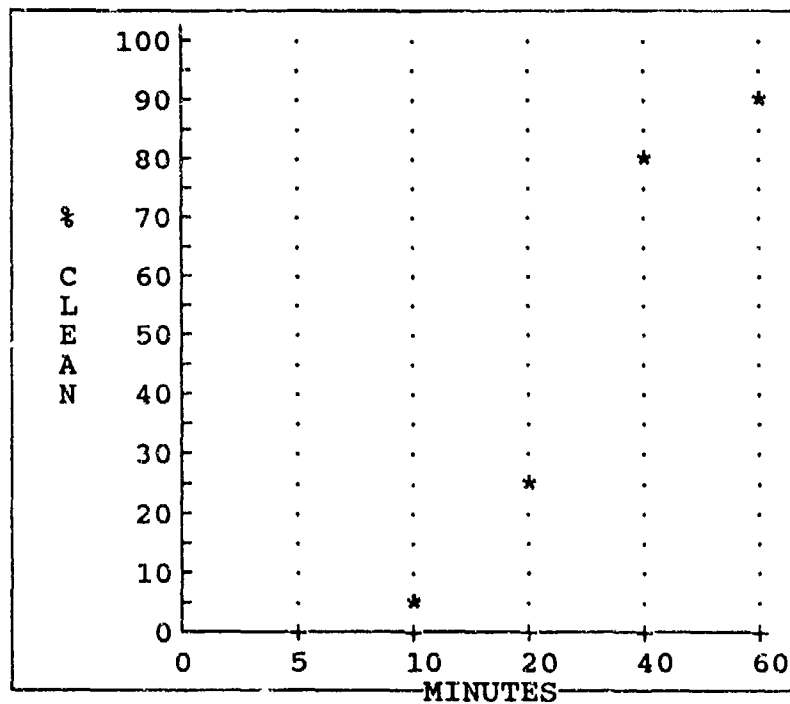


JOHNSON WAX/GEM STATE PAP
J-SHOP 500
GREASE: 1:4 AT 100 F

310S

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED
72% 87%
95% 85%
84% 95%
96% 77%
97% 92%

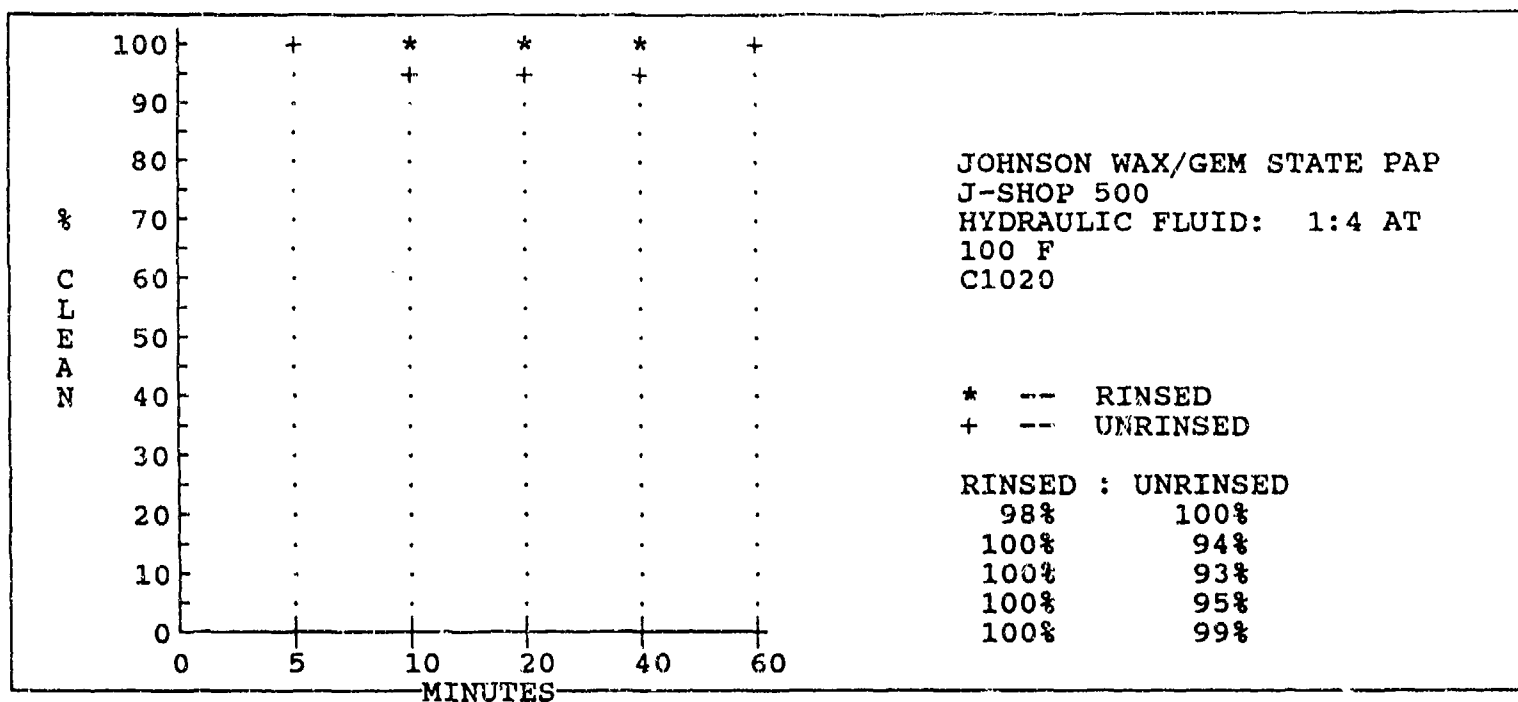


JOHNSON WAX/GEM STATE PAP
J-SHOP 500
OIL/XYLENE 1:4 AT 100

310S

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED
2% 0%
4% 1%
27% 0%
78% 0%
90% 0%



COMPANY - JOHNSON WAX/GEM ST	730*	*	*	.	*	.	.	
PRODUCT - J-SHOP 600	694+	.	.	*	.	*	*	0- 719
TOC INIT- 79526	657+	.	.	.	.	.	.	1- 714
TOC 2nd - 0	621+	.	.	.	.	.	.	2- 730
COD INIT- 1565000	584+	.	.	.	.	.	.	3- 708
ANILINE PT - 0.0000	548+	.	.	.	.	.	.	4- 722
ATP ----- -103 E-8	511+	.	.	.	.	.	.	5- 710
	475+	.	.	.	.	.	.	6- 711
SOLUBILITY DATA:	438+	.	.	.	.	.	.
	402+	.	.	.	.	.	.	DRY
	365+	.	.	.	.	.	.	WEIGHT
	329+	.	.	.	.	.	.	0.0400
	292+	.	.	.	.	.	.
	256+	.	.	.	.	.	.
	219+	.	.	.	.	.	.
	183+	.	.	.	.	.	.
	146+	.	.	.	.	.	.
	110+	.	.	.	.	.	.
	73+	.	.	.	.	.	.
	37+	.	.	.	.	.	.
	0	.	.	.	.	.	.

DATE - 06/21/88 COD vs TIME 0 1 2 3 4 5 6

PHENOL	261+	*	.	.	.	.	.
06/21/88	248*	.	.	.	.	.	.	0- 254
ATP - -42 E-8	235+	.	.	.	.	.	.	1- 261
	222+	.	*	*	*	.	.	2- 220
	209+	.	.	.	.	*	.	3- 216
	196+	.	.	.	.	.	*	4- 224
HUNTINGTON	183+	.	.	.	.	.	.	5- 204
LHTS	170+	.	.	.	.	.	.	6- 199
	157+	.	.	.	.	.	.
HUNTINGTON	144+	.	.	.	.	.	.	DRY
THUNDER BOLT	131+	.	.	.	.	.	.	WEIGHT
	117+	.	.	.	.	.	.	0.0400
JOHNSON WAX/GEM STATE PAP	104+	.	.	.	.	.	.
BIG BARE	91+	.	.	.	.	.	.
	78+	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	65+	.	.	.	.	.	.
J-SHOP 500	52+	.	.	.	.	.	.
	39+	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP	26+	.	.	.	.	.	.
J-SHOP 600	13+	.	.	.	.	.	.
	0	.	.	.	.	.	.

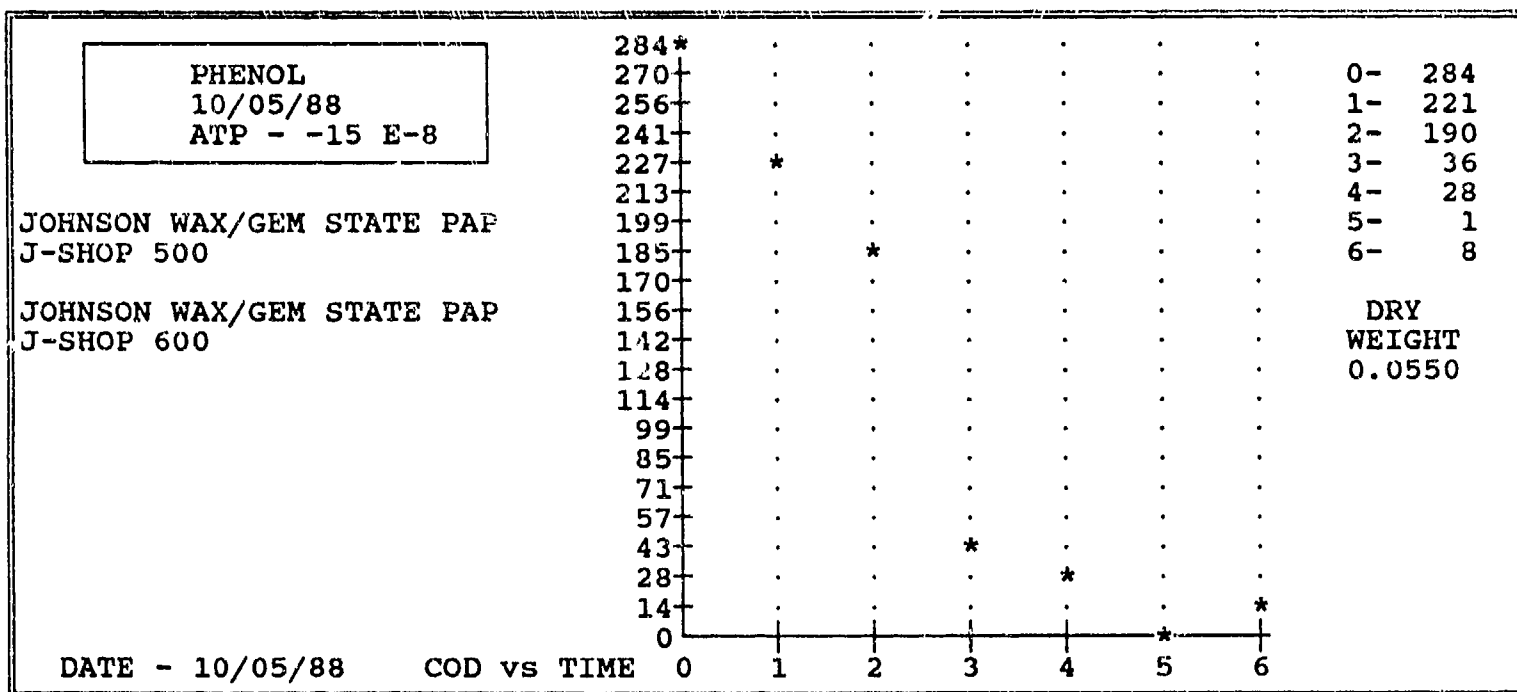
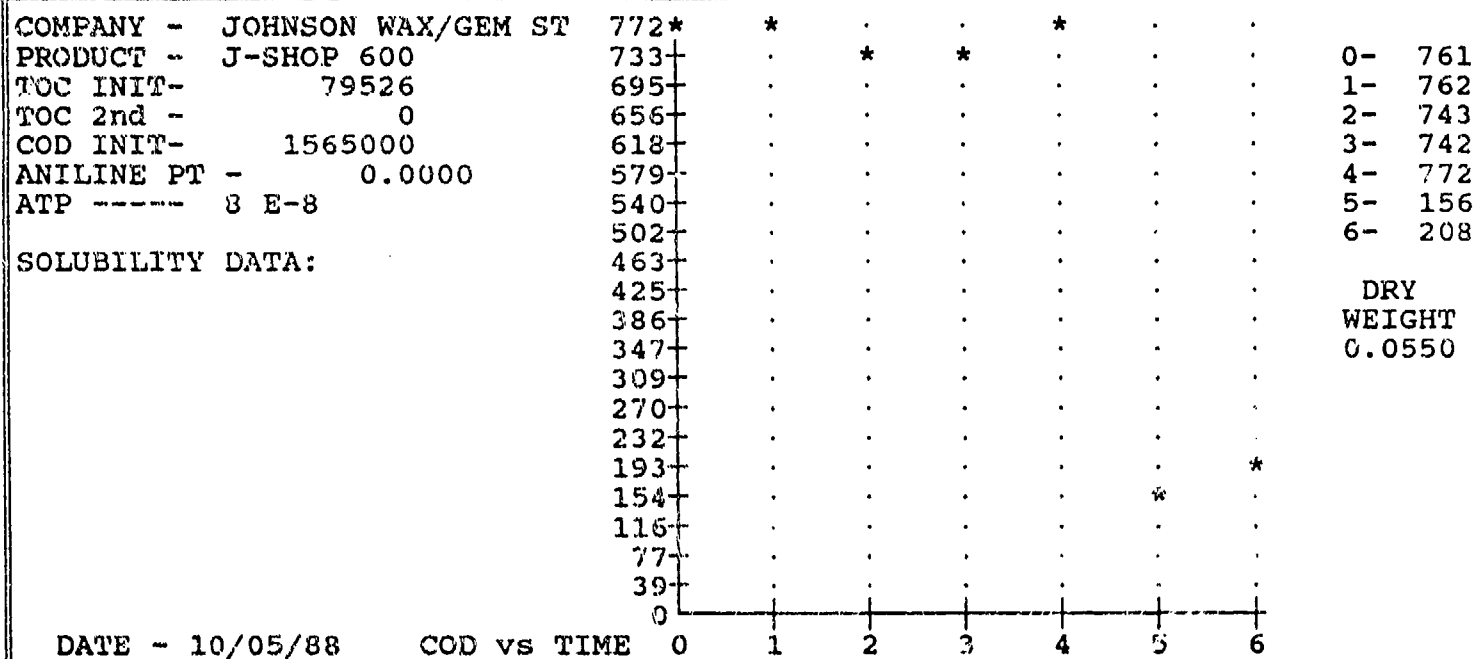
DATE - 06/21/88 COD vs TIME 0 1 2 3 4 5 6

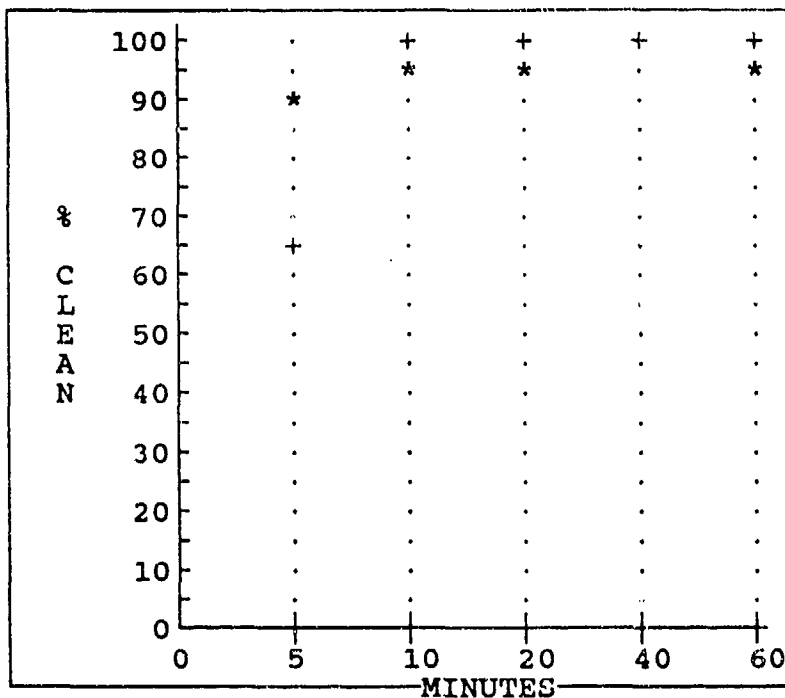
COMPANY - JOHNSON WAX/GEM ST	761	*	.	.	.	.	.	.
PRODUCT - J-SHOP 600	723	.	*	*	.	.	.	.	0- 694
TOC INIT- 79526	685*	.	.	.	.	.	.	.	1- 761
TOC 2nd - 0	647	.	.	.	.	.	.	.	2- 704
COD INIT- 1565000	609	.	.	.	.	*	*	.	3- 710
ANILINE PT - 0.0000	571	.	.	.	*	.	.	.	4- 580
ATP ----- -7 E-8	533	.	.	.	.	.	.	.	5- 598
	495	.	.	.	.	.	.	.	6- 616
SOLUBILITY DATA:	457	.	.	.	.	.	.	.
	419	.	.	.	.	.	.	.	DRY
	381	.	.	.	.	.	.	.	WEIGHT
	342	.	.	.	.	.	.	.	0.0835
	304	.	.	.	.	.	.	.
	266	.	.	.	.	.	.	.
	228	.	.	.	.	.	.	.
	190	.	.	.	.	.	.	.
	152	.	.	.	.	.	.	.
	114	.	.	.	.	.	.	.
	76	.	.	.	.	.	.	.
	38	.	.	.	.	.	.	.
	0	.	.	.	.	.	.	.

DATE - 09/29/88 COD vs TIME 0 1 2 3 4 5 6

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PHENOL 09/29/88 ATP - 60 E-8 </div>		340*	0- 340
		323	.	.	.	.	.	.	1- 188
		306	.	.	.	.	.	.	2- 136
		289	.	.	.	.	.	.	3- -25
		272	.	.	.	.	.	.	4- -25
		255	.	.	.	.	.	.	5- -25
HUNTINGTON		238	.	.	.	.	.	.	6- -25
THUNDER BOLT		221	.	.	.	.	.	.
		204	.	.	.	.	.	.
JOHNSON WAX/GEM STATE PAP		187	*	.	.	.	.	.	DRY
J-SHOP 500		170	.	.	.	.	.	.	WEIGHT
		153	.	.	.	.	.	.	0.0835
JOHNSON WAX/GEM STATE PAP		136	.	*	.	.	.	.
J-SHOP 600		119	.	.	.	.	.	.
		102	.	.	.	.	.	.
		85	.	.	.	.	.	.
		68	.	.	.	.	.	.
		51	.	.	.	.	.	.
		34	.	.	.	.	.	.
		17	.	.	.	.	.	.
		0	.	.	.	.	.	.

DATE - 09/29/88 COD vs TIME 0 1 2 * * * *

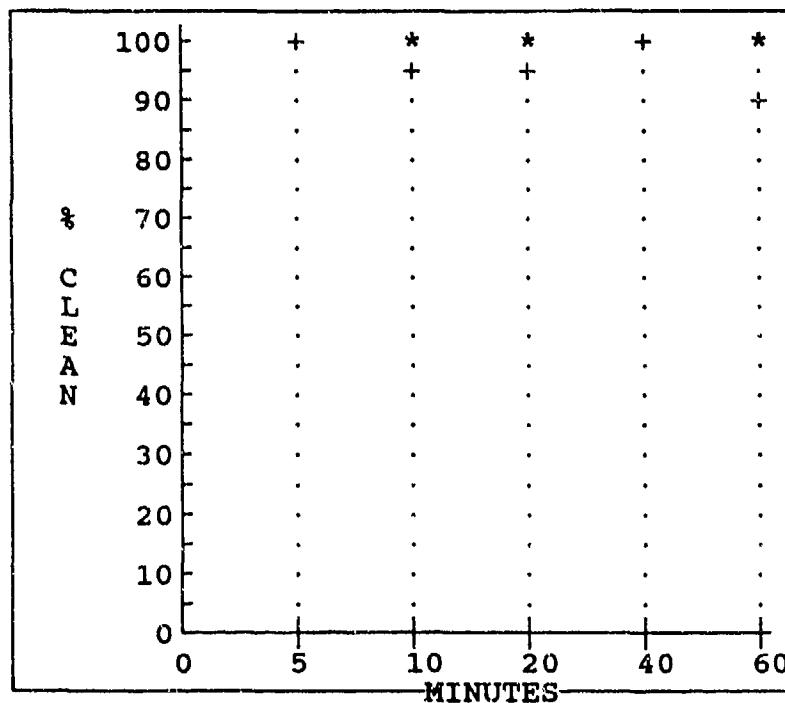




JOHNSON WAX/GEM STATE PAP
J-SHOP 600
GREASE: 1:10 AT 100 F
MONEL K-500

* -- RINSED
+ -- UNRINSED

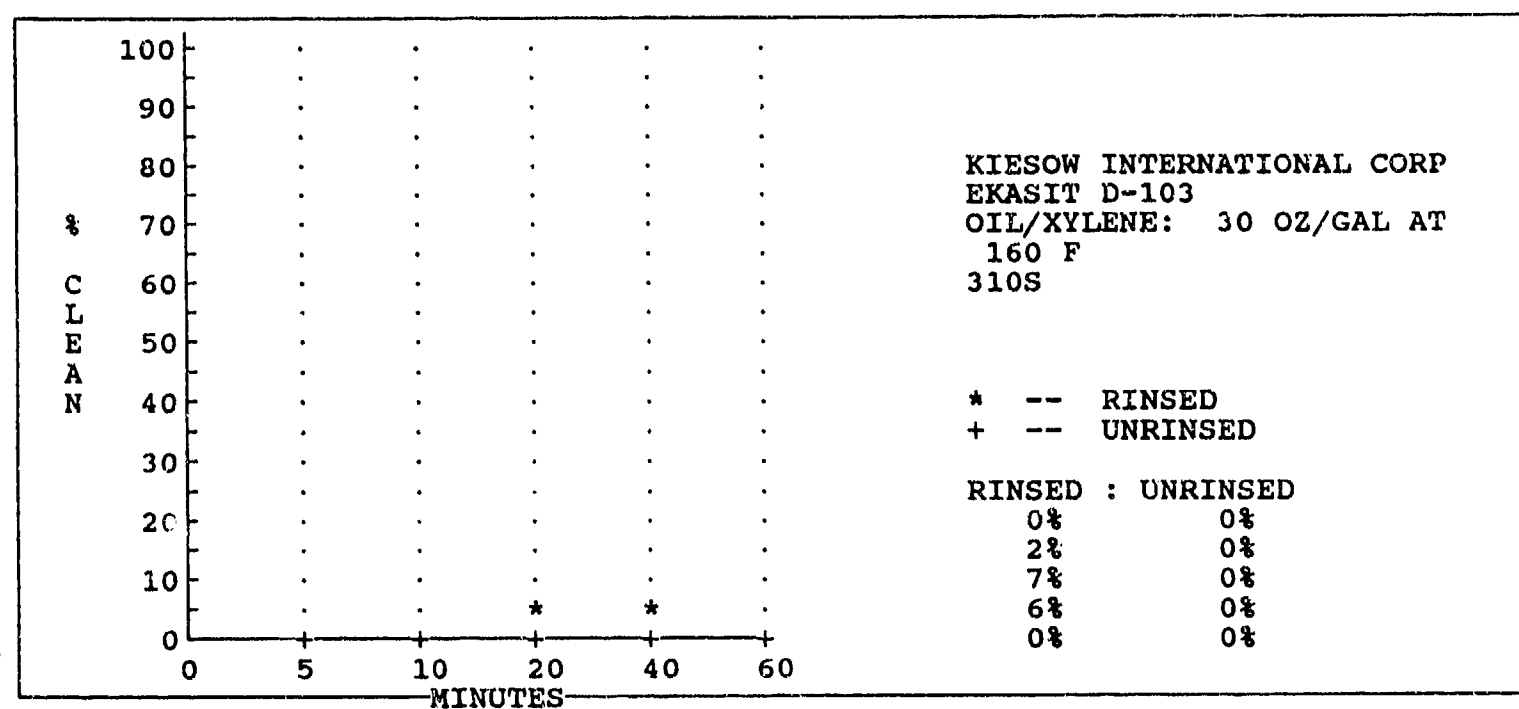
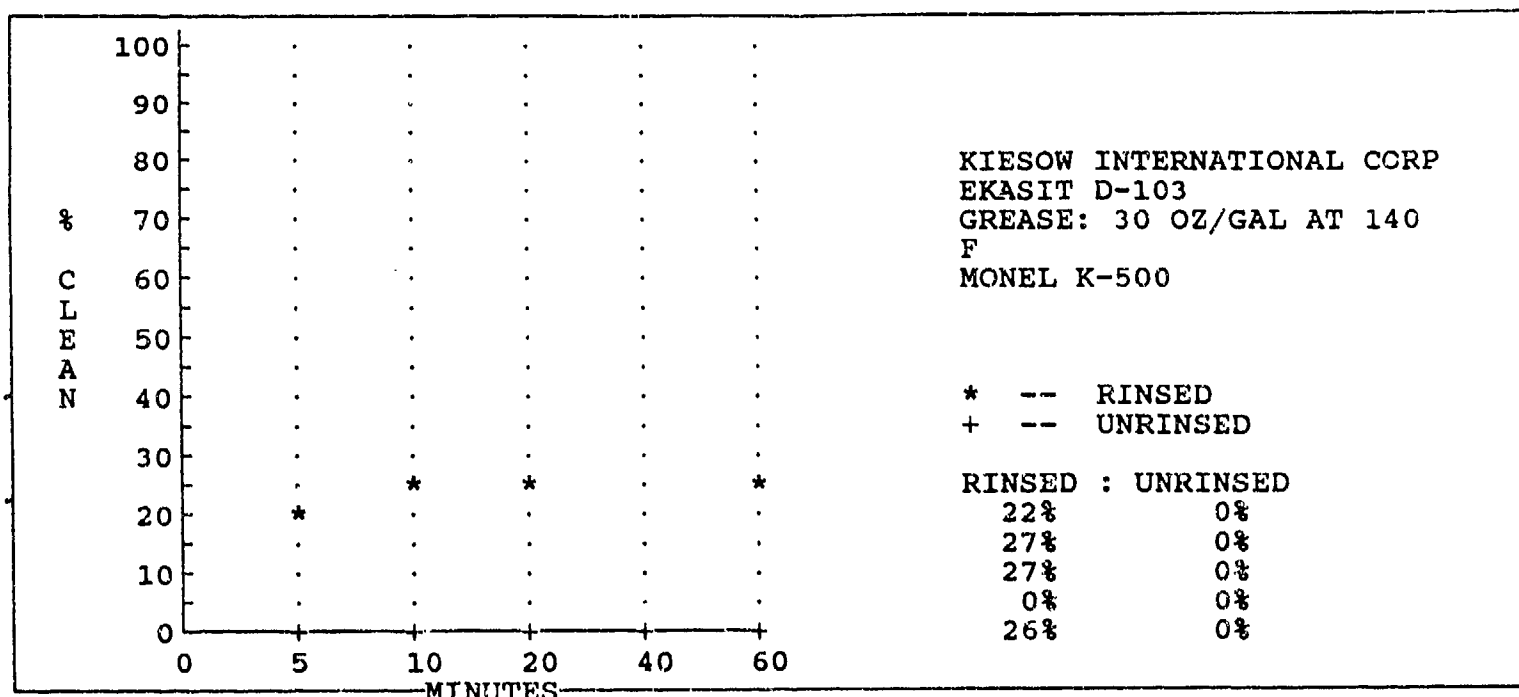
RINSED : UNRINSED	
91%	63%
94%	100%
97%	100%
100%	100%
96%	98%

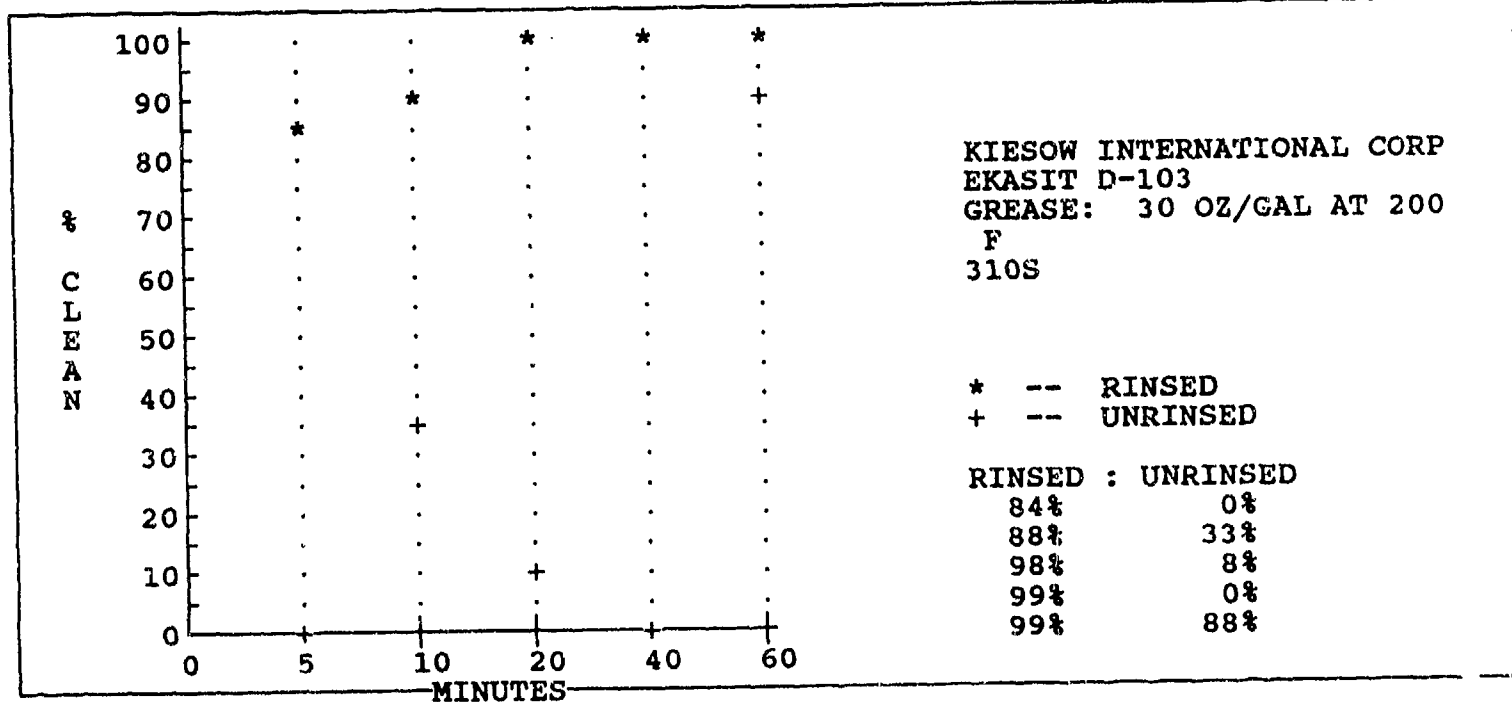
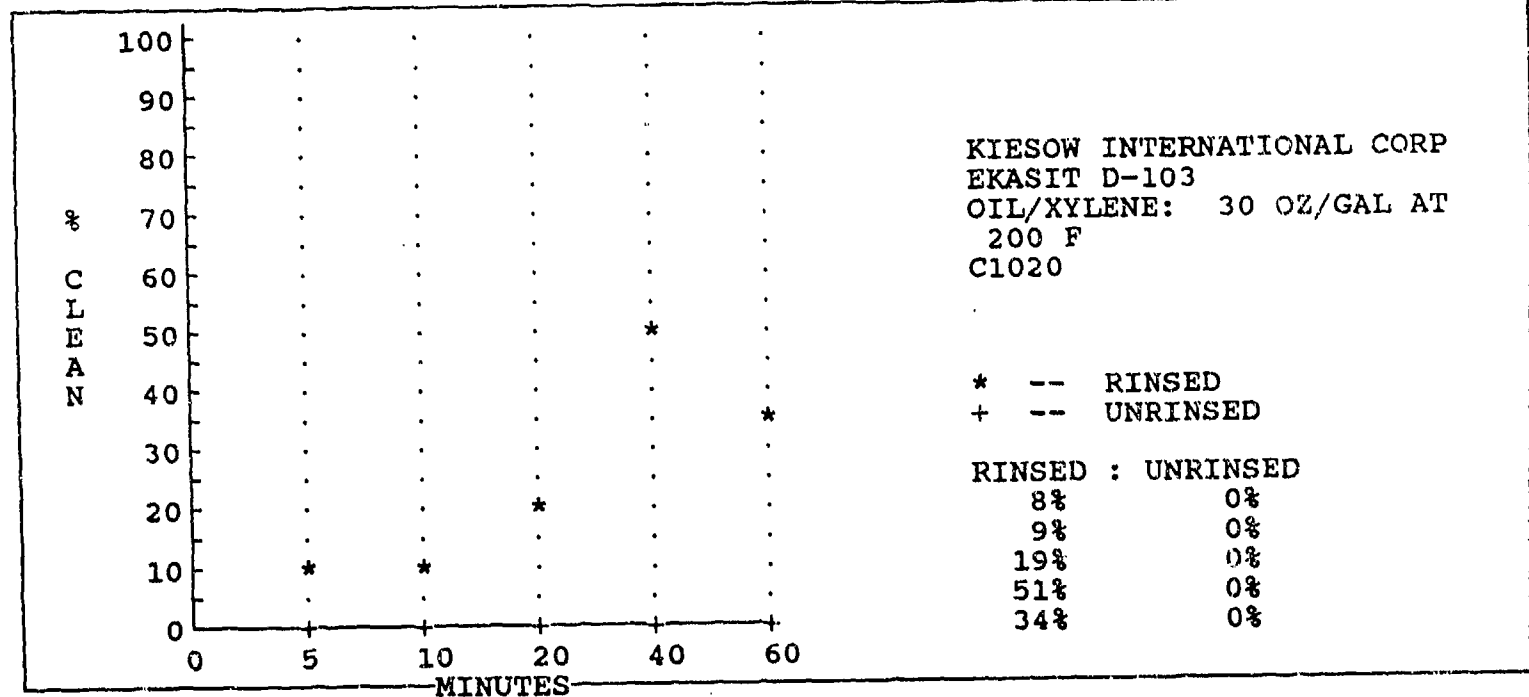


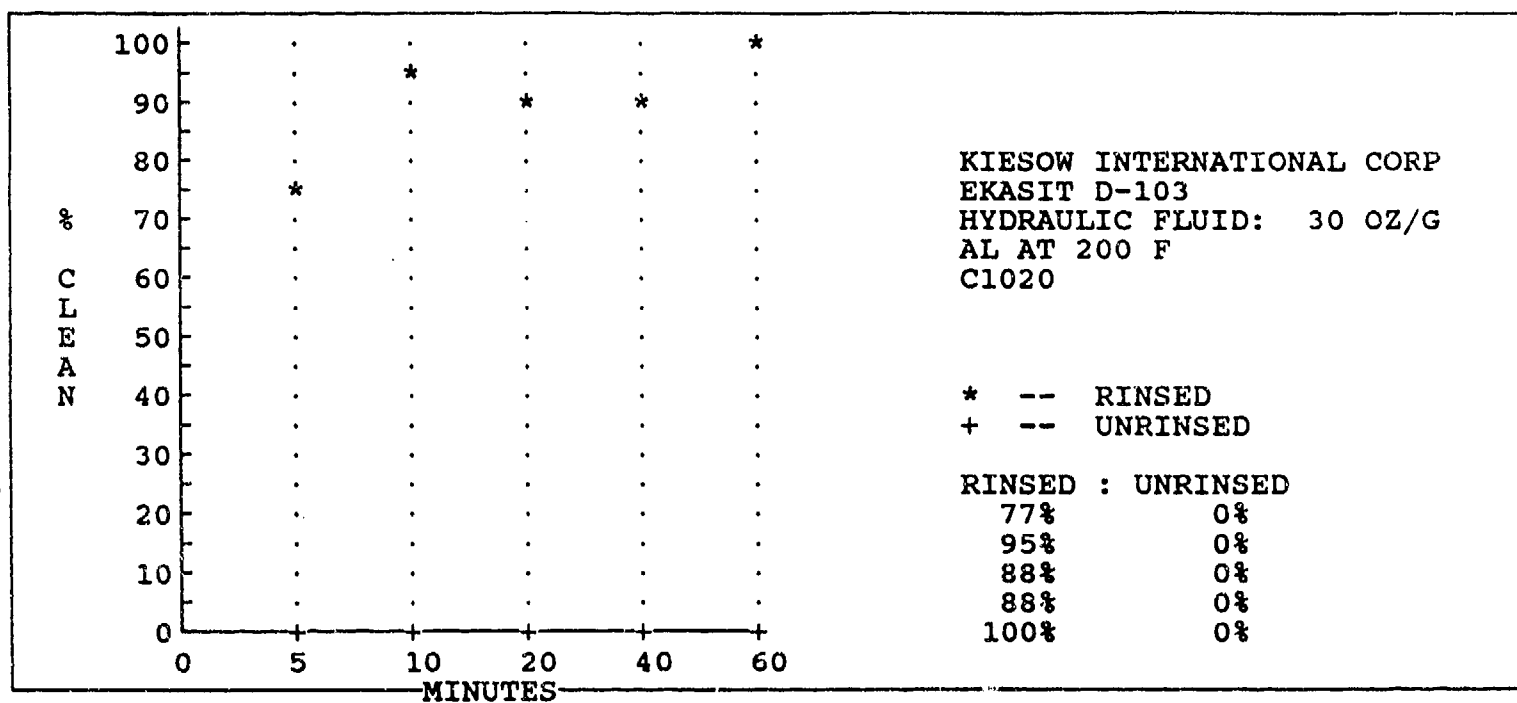
JOHNSON WAX/GEM STATE PAP
J-SHOP 600
HYDRAULIC FLUID: 1:10 AT
100 F
310S

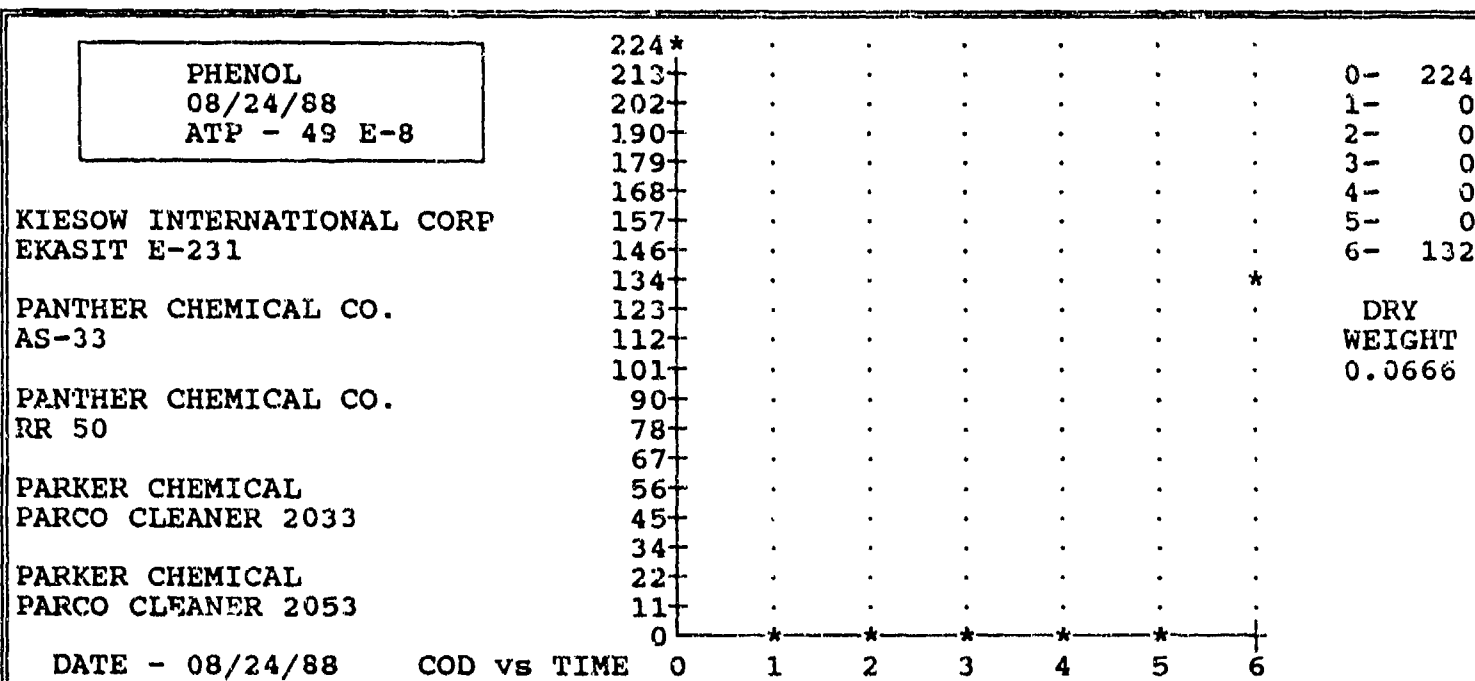
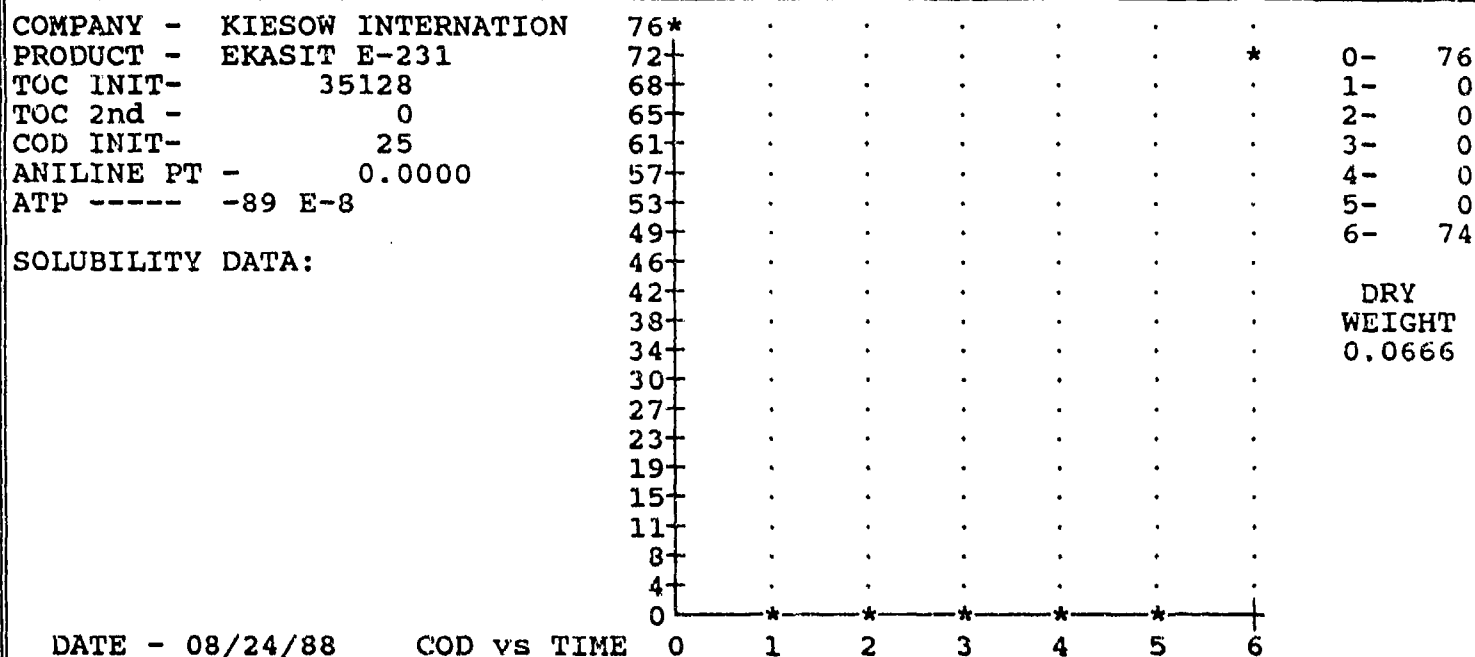
* -- RINSED
+ -- UNRINSED

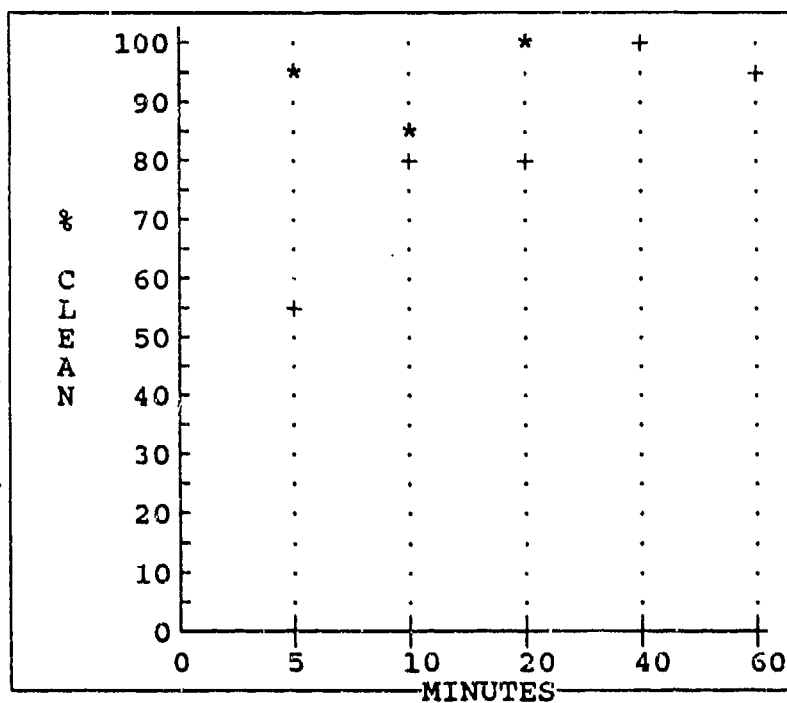
RINSED : UNRINSED	
100%	100%
100%	95%
99%	96%
100%	98%
100%	92%









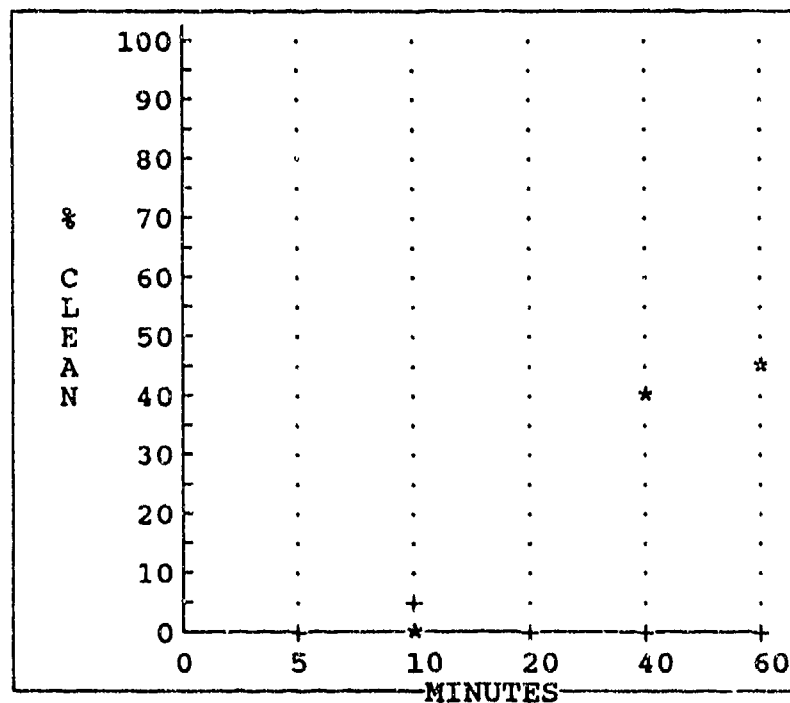


KIESOW INTERNATIONAL CORP
EKASIT E-231
GREASE: 8 OZ/GAL, 180 F

Al2024

* -- RINSED
+ -- UNRINSED

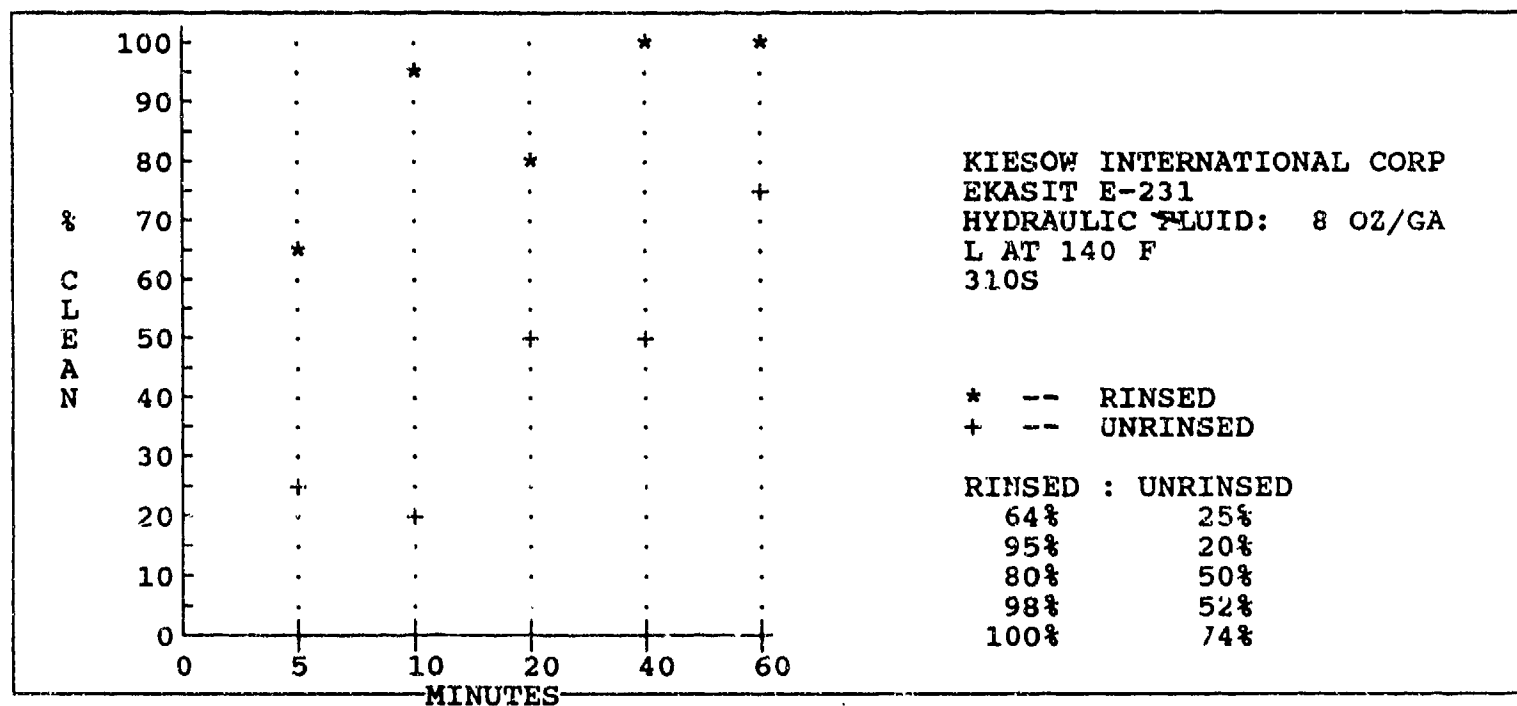
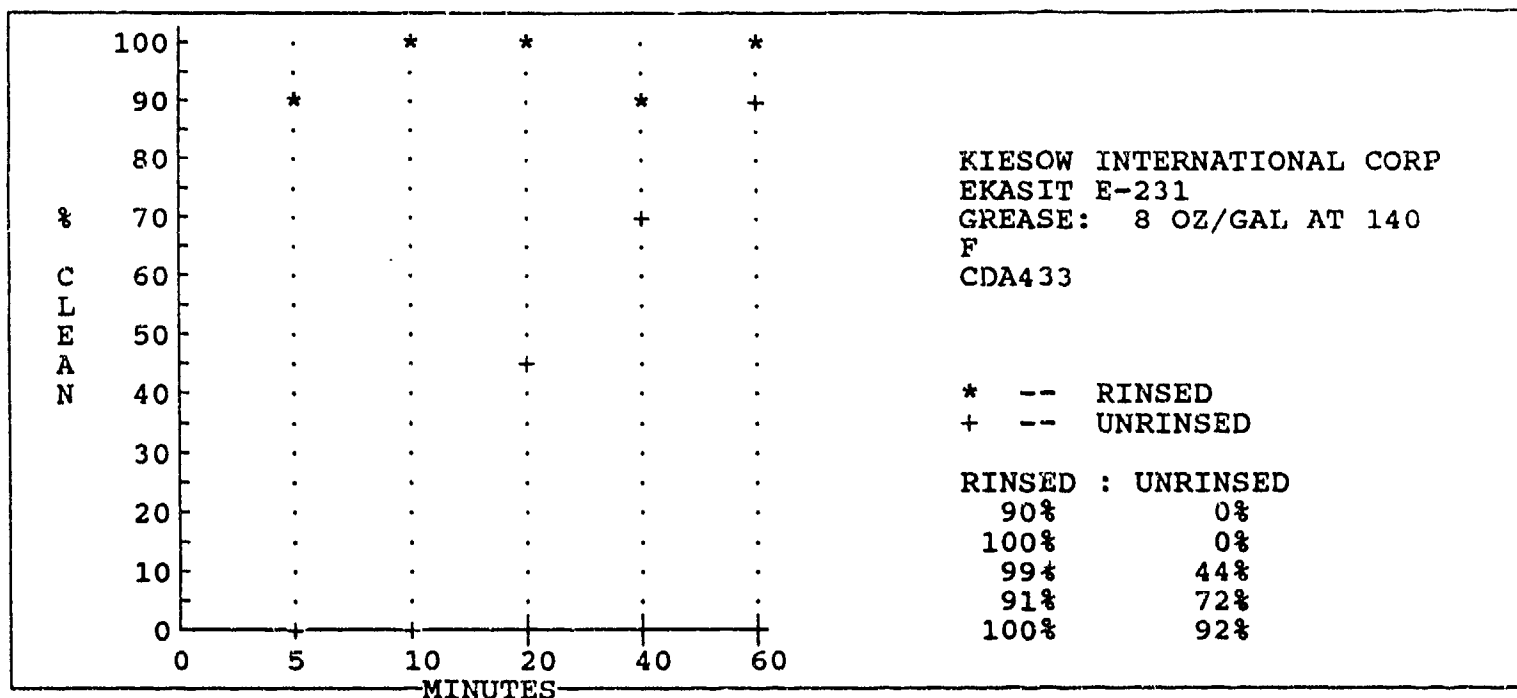
RINSED : UNRINSED	
97%	57%
87%	79%
98%	81%
100%	99%
95%	96%

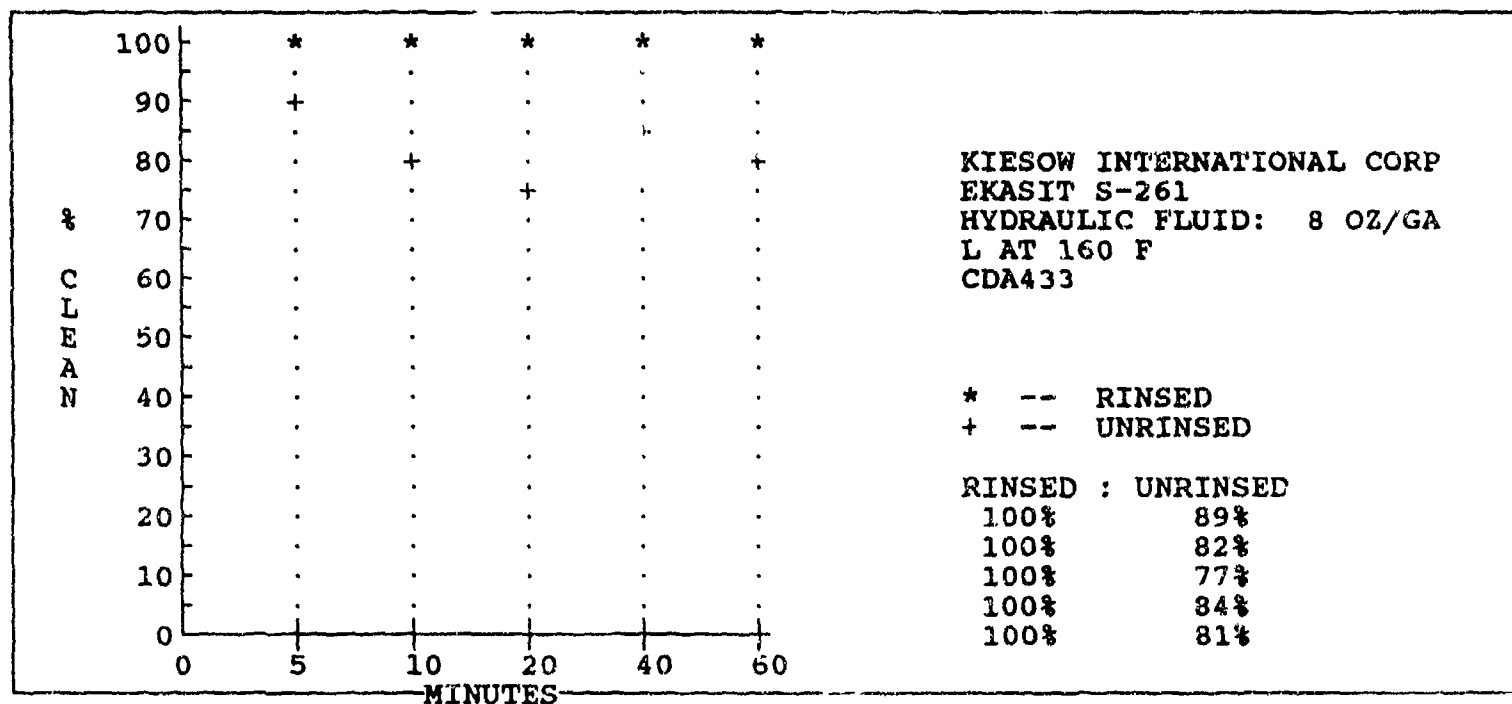
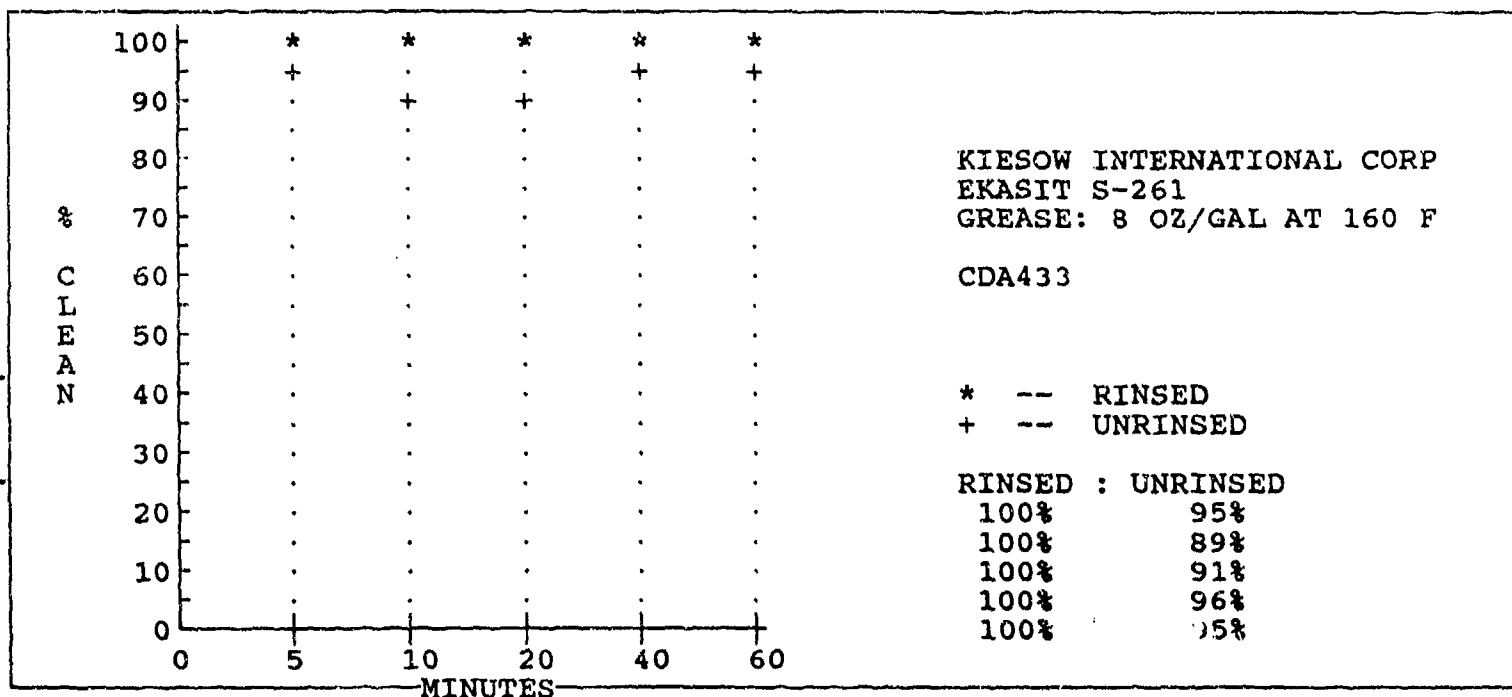


KIESOW INTERNATIONAL CORP
EKASIT E-231
OIL & XYLENE: 8 OZ/GAL AT
140 F
CDA433

* -- RINSED
+ -- UNRINSED

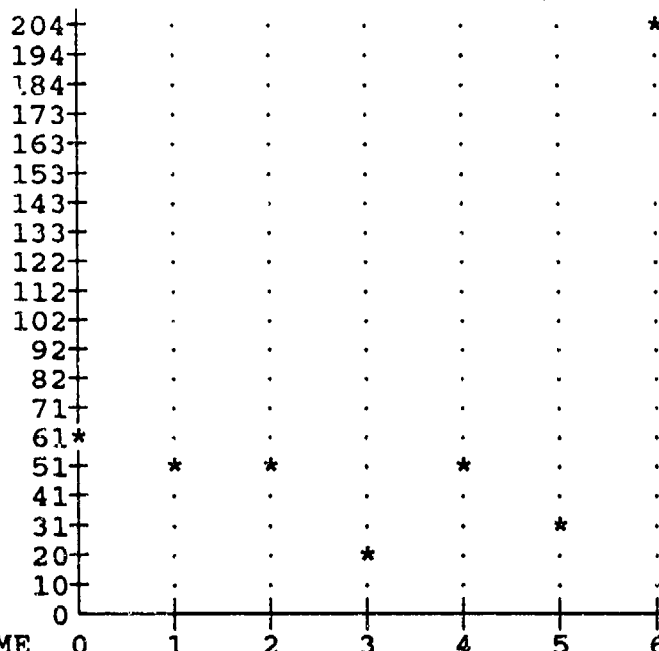
RINSED : UNRINSED	
0%	0%
0%	4%
0%	0%
41%	0%
43%	0%





COMPANY - KLEER-FLO COMPANY
 PRODUCT - DEGREASOL 99R
 TOC INIT- 84329
 TOC 2nd - 0
 COD INIT- 184500
 ANILINE PT - 0.0000
 ATP ----- 20 E-8

SOLUBILITY DATA:



0- 62
 1- 49
 2- 53
 3- 21
 4- 56
 5- 30
 6- 204

DRY
 WEIGHT
 0.0714

DATE - 06/29/88

COD vs TIME

0 1 2 3 4 5 6

PHENOL
 06/29/88
 ATP - 16 E-8

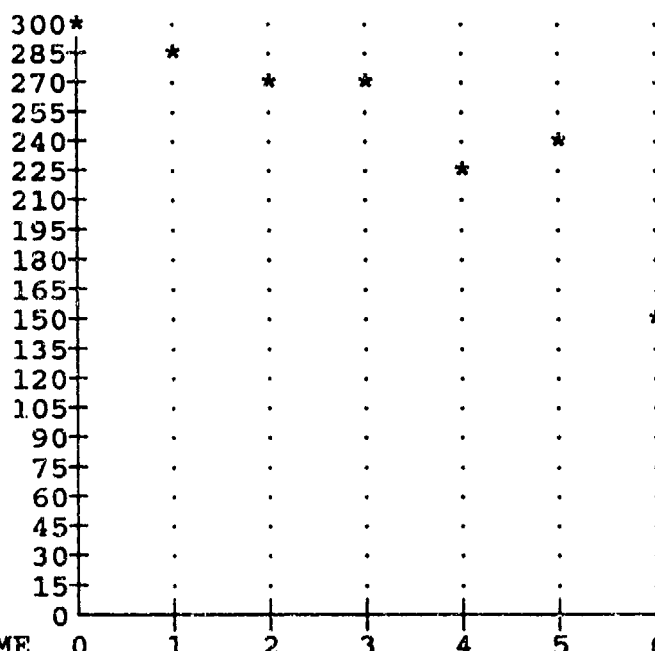
KLEER-FLO COMPANY
 DEGREASOL 99R

KLEER-FLO COMPANY
 HI-T DEGREASER

LAKE PRODUCTS CO. INC.
 LAKE-97

M-OIL-FREE CO.
 M-OIL-FREE #1000

PACIFIC CHEMICAL
 FIST



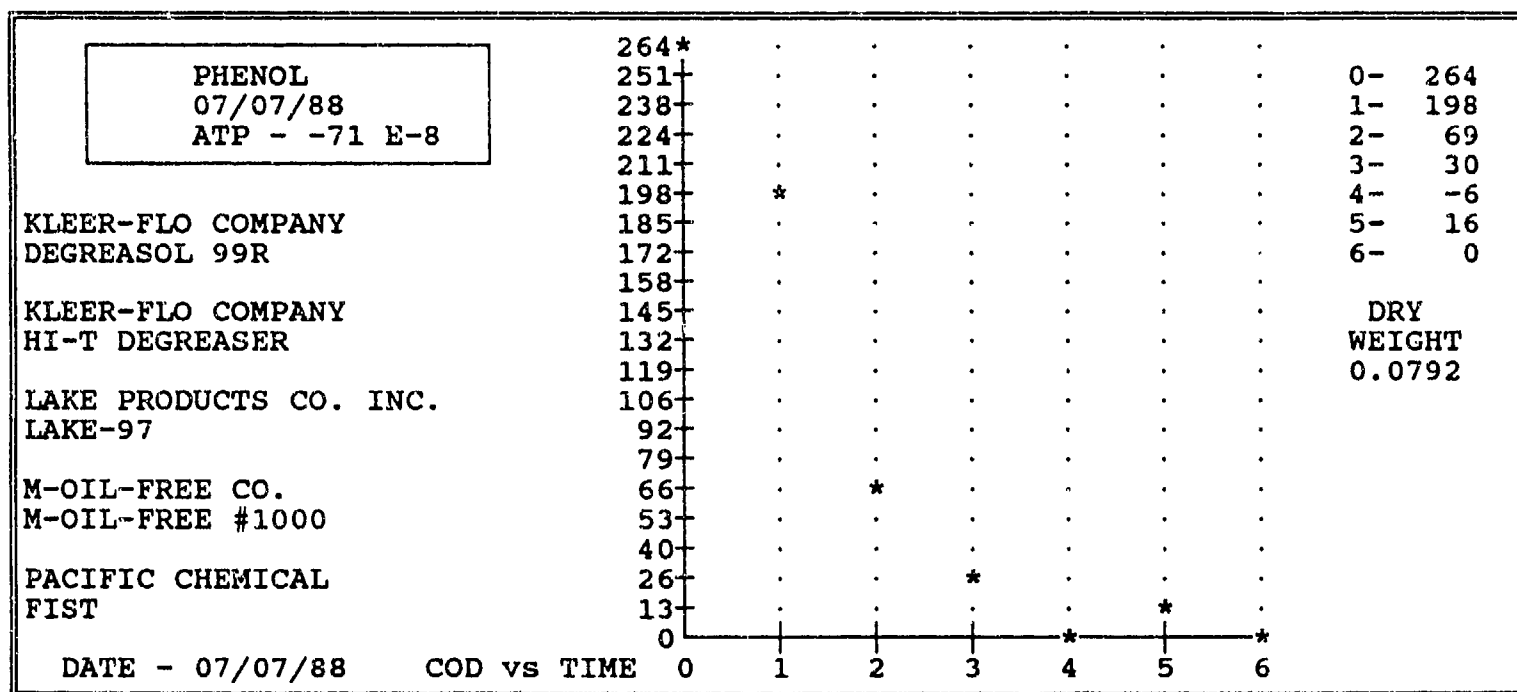
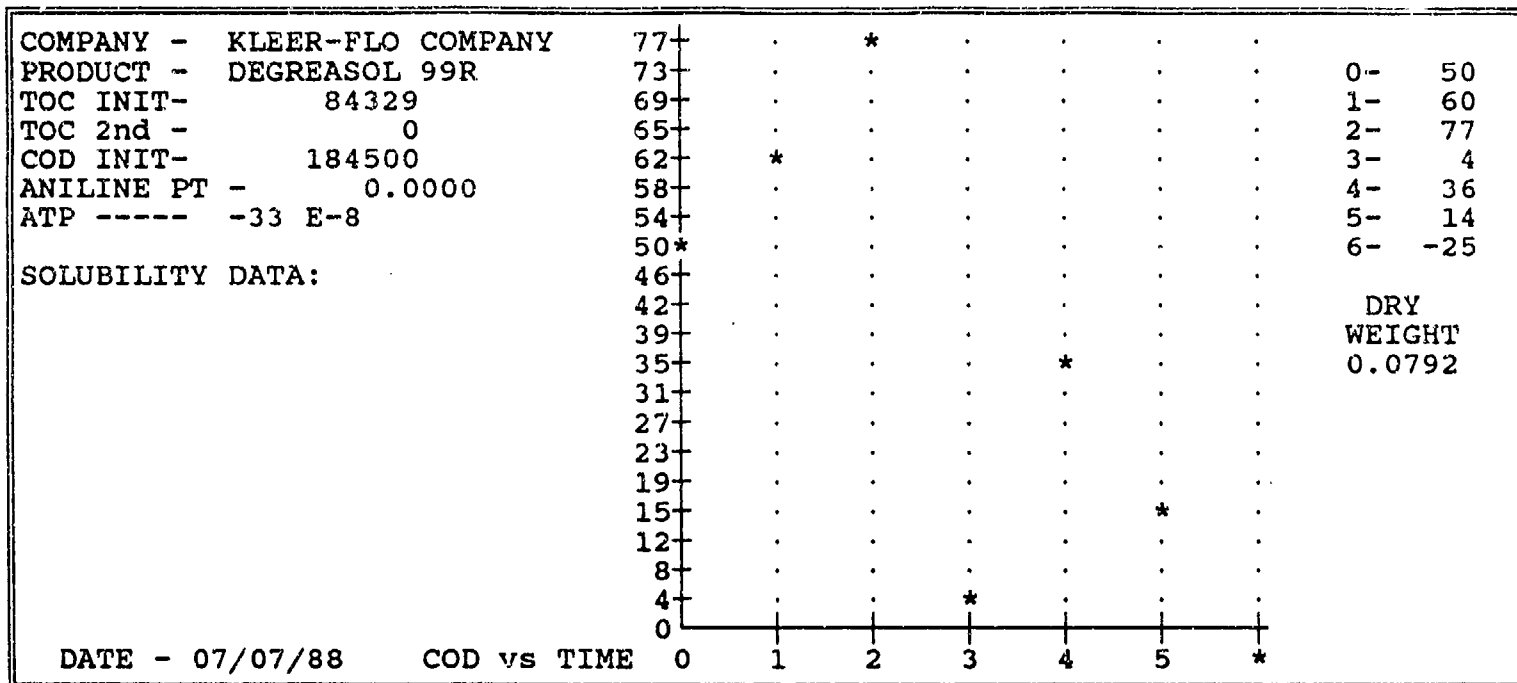
0- 300
 1- 290
 2- 266
 3- 276
 4- 232
 5- 236
 6- 150

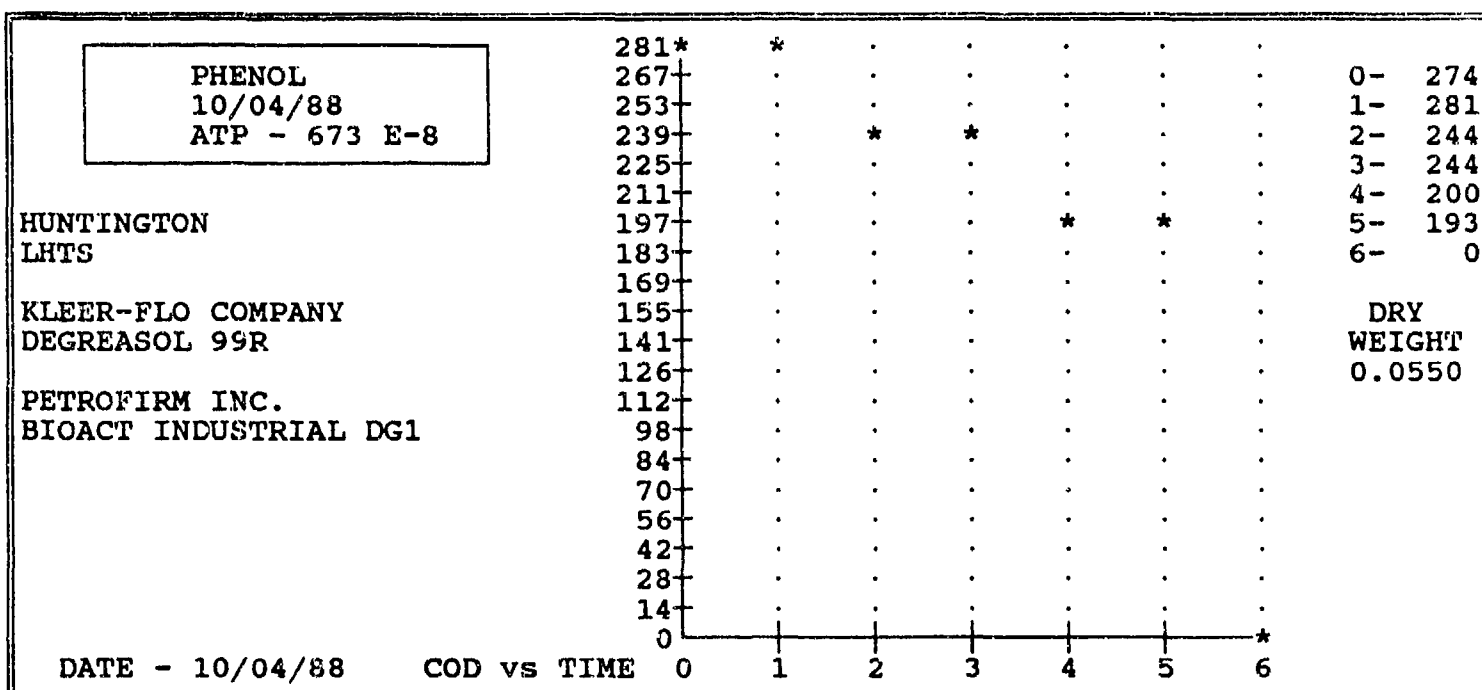
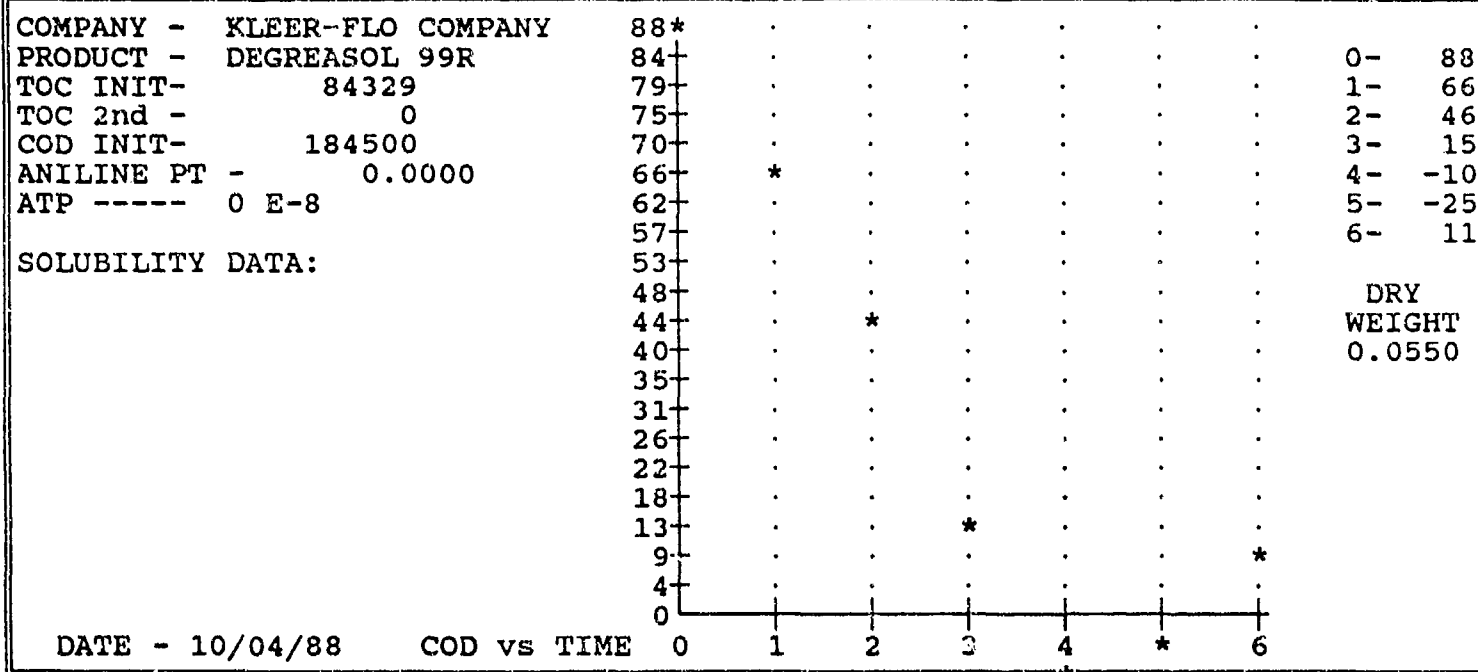
DRY
 WEIGHT
 0.0714

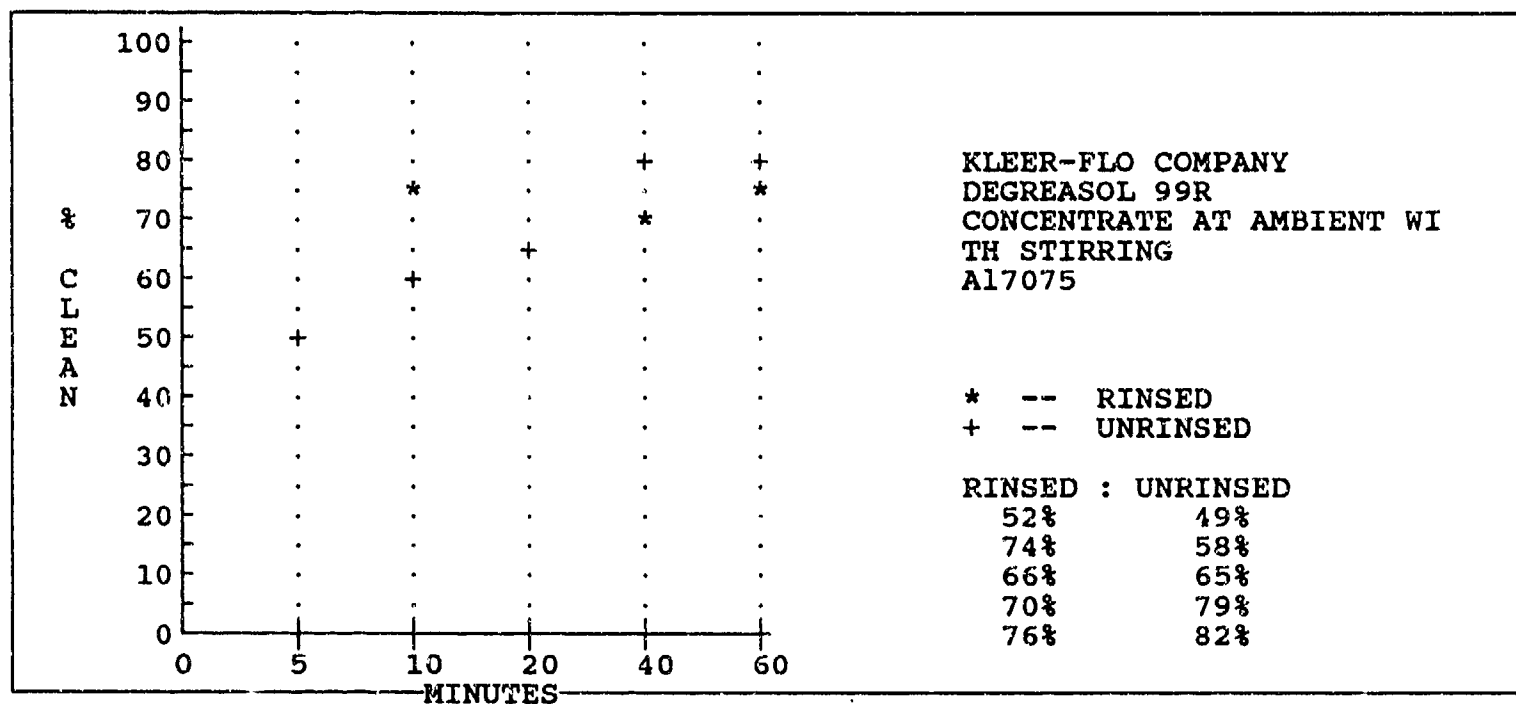
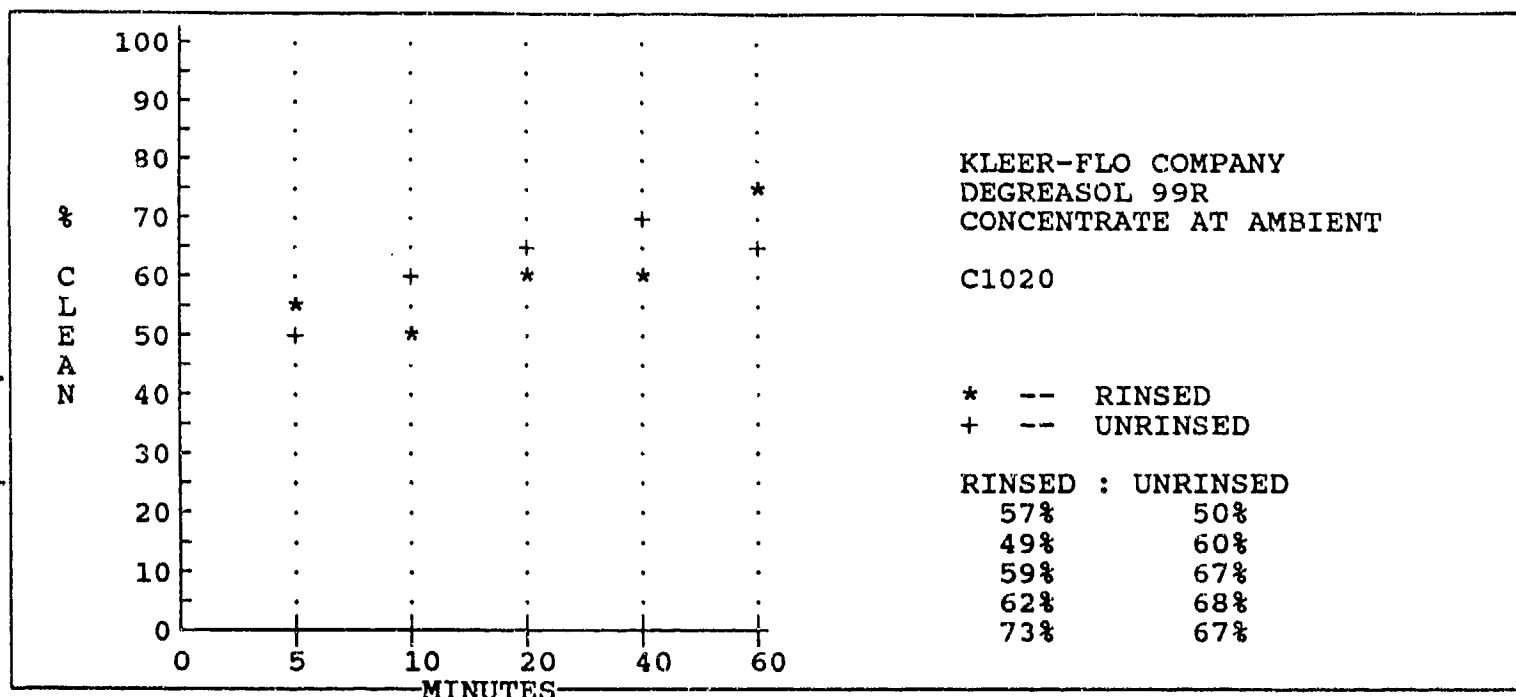
DATE - 06/29/88

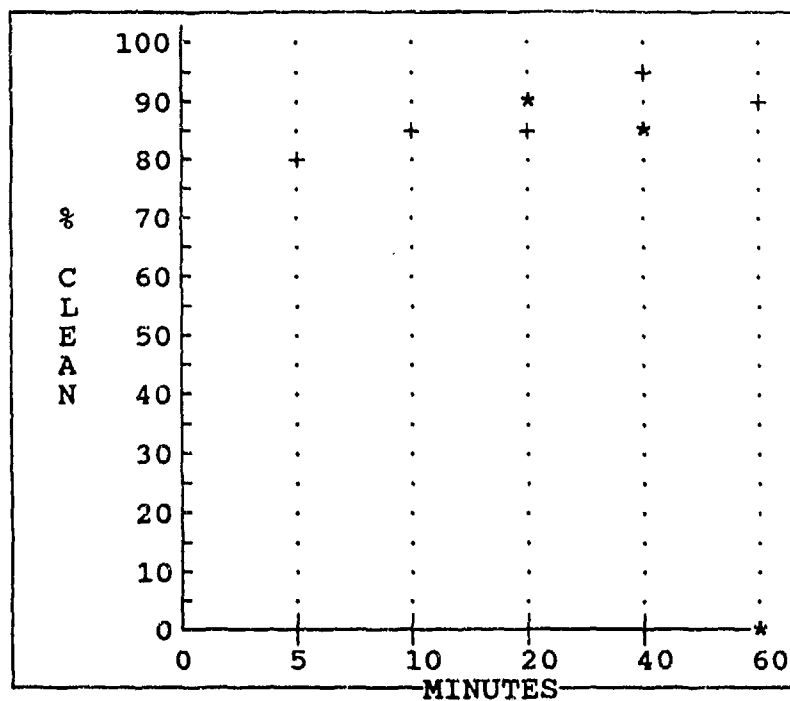
COD vs TIME

0 1 2 3 4 5 6







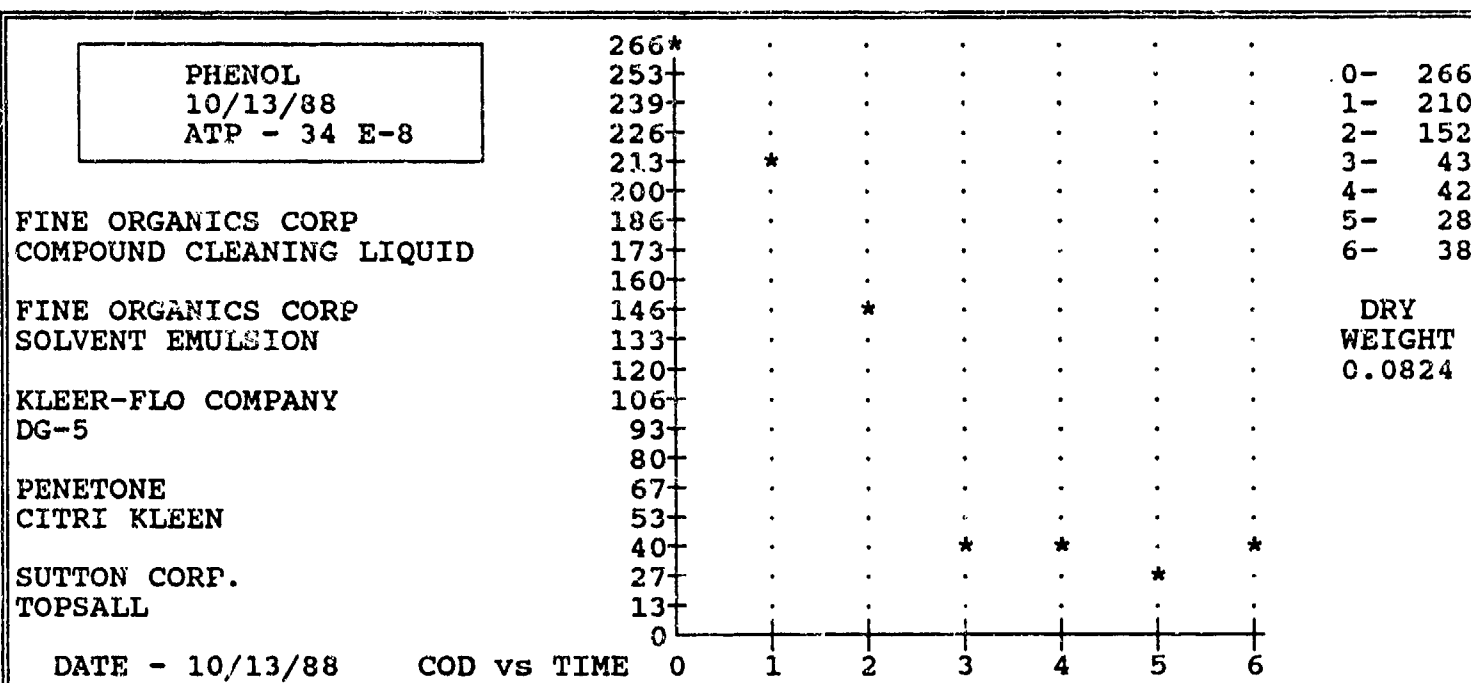
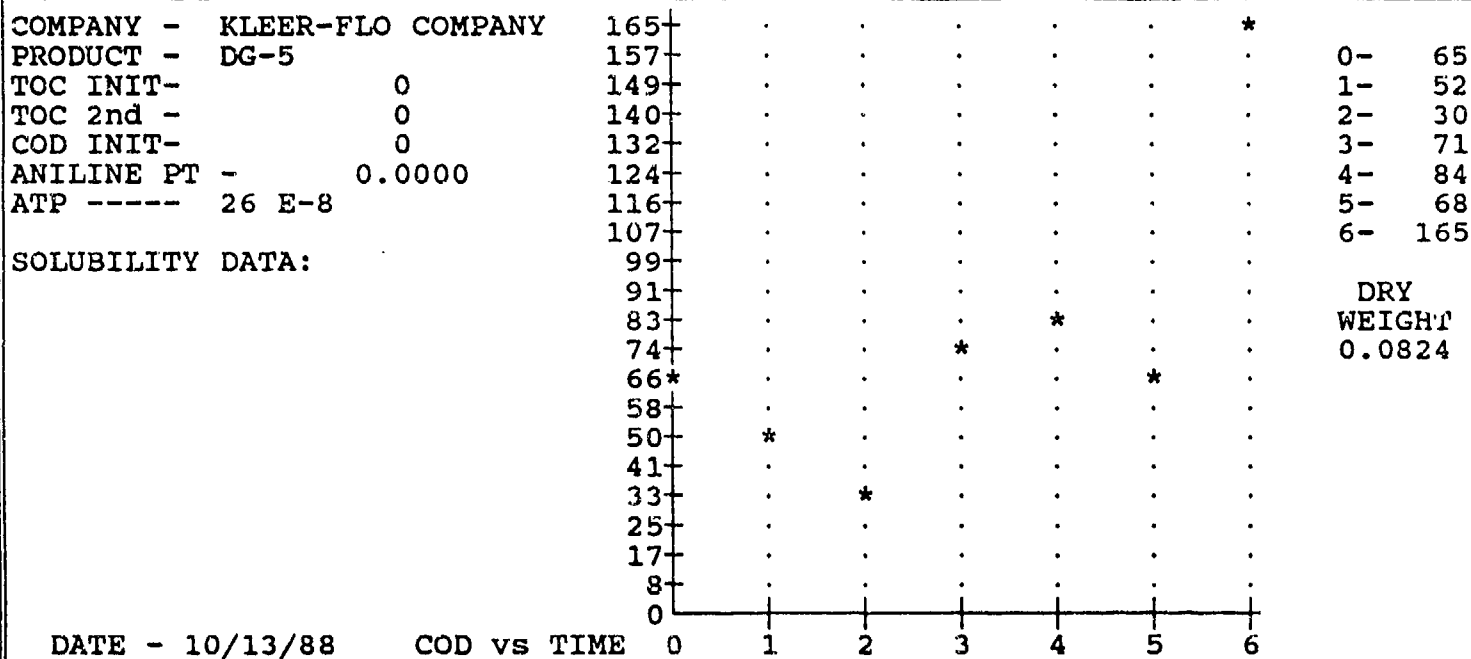


KLEER-FLO COMPANY
DEGREASOL 99R
CONCENTRATE AT 100 F

310S

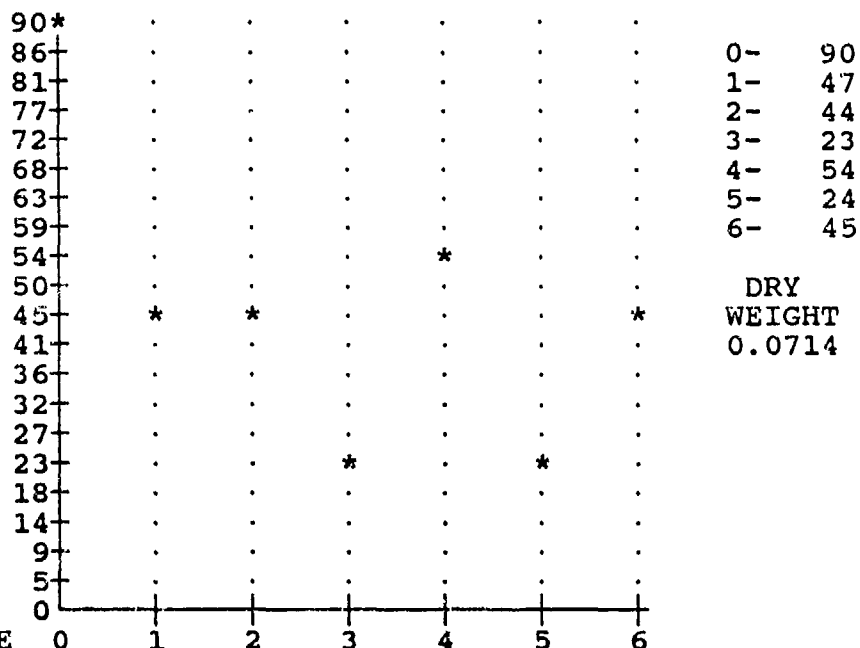
* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED	
78%	81%
84%	83%
88%	84%
6%	96%
0%	91%



COMPANY - KLEER-FLO COMPANY
 PRODUCT - HI-T DEGREASER
 TOC INIT- 0
 TOC 2nd - 0
 COD INIT- 535000
 ANILINE PT - 0.0000
 ATP ----- -2 E-8

SOLUBILITY DATA:



DATE - 06/29/88

COD vs TIME

DRY
WEIGHT
0.0714

PHENOL
 06/29/88
 ATP - 16 E-8

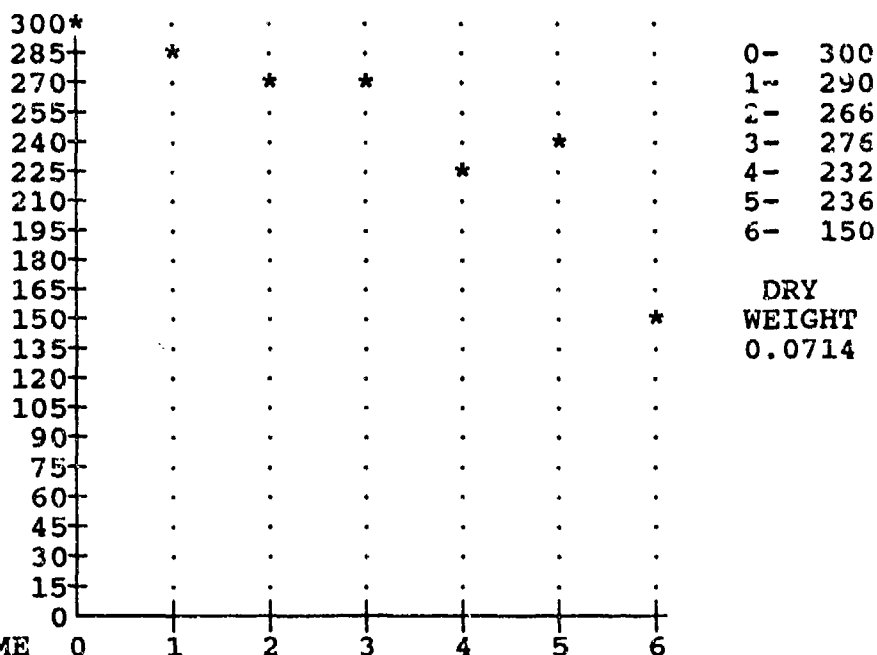
KLEER-FLO COMPANY
 DEGREASOL 99R

KLEER-FLO COMPANY
 HI-T DEGREASER

LAKE PRODUCTS CO. INC.
 LAKE-97

M-OIL-FREE CO.
 M-OIL-FREE #1000

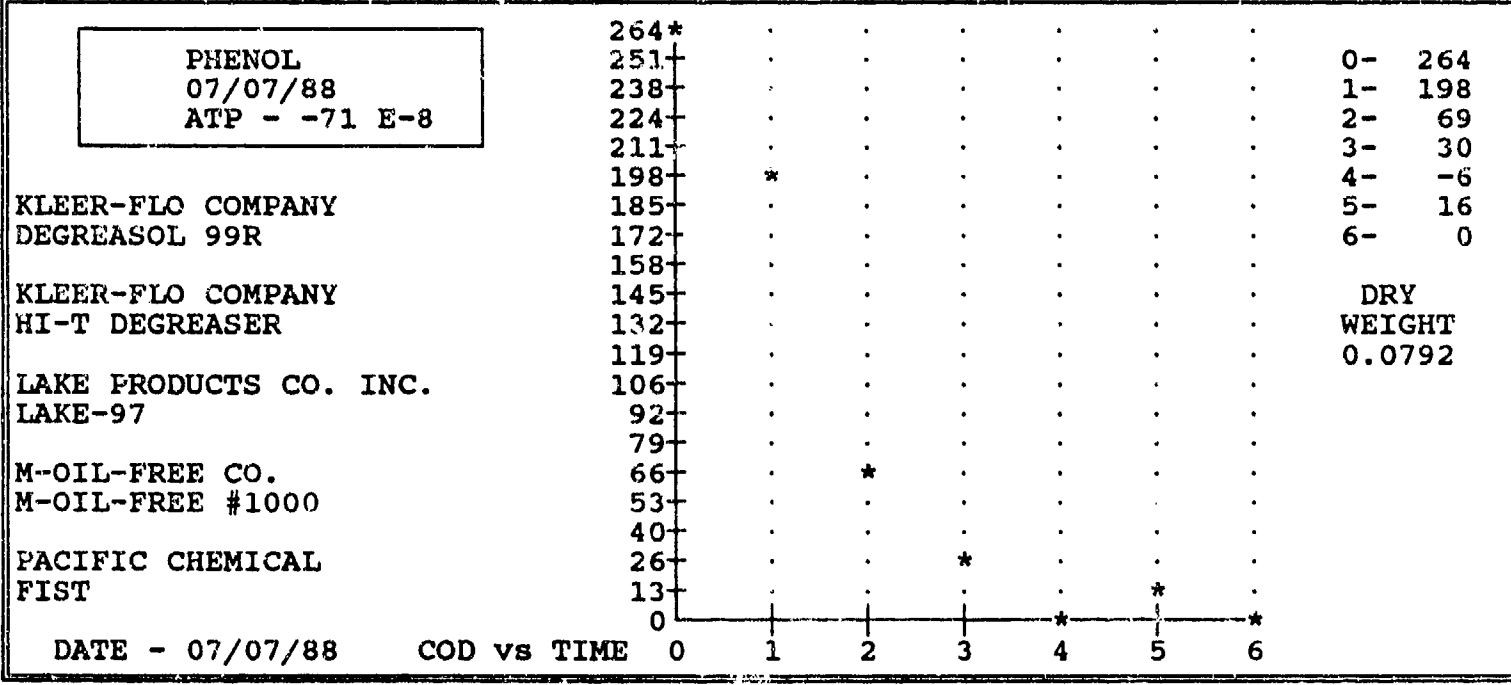
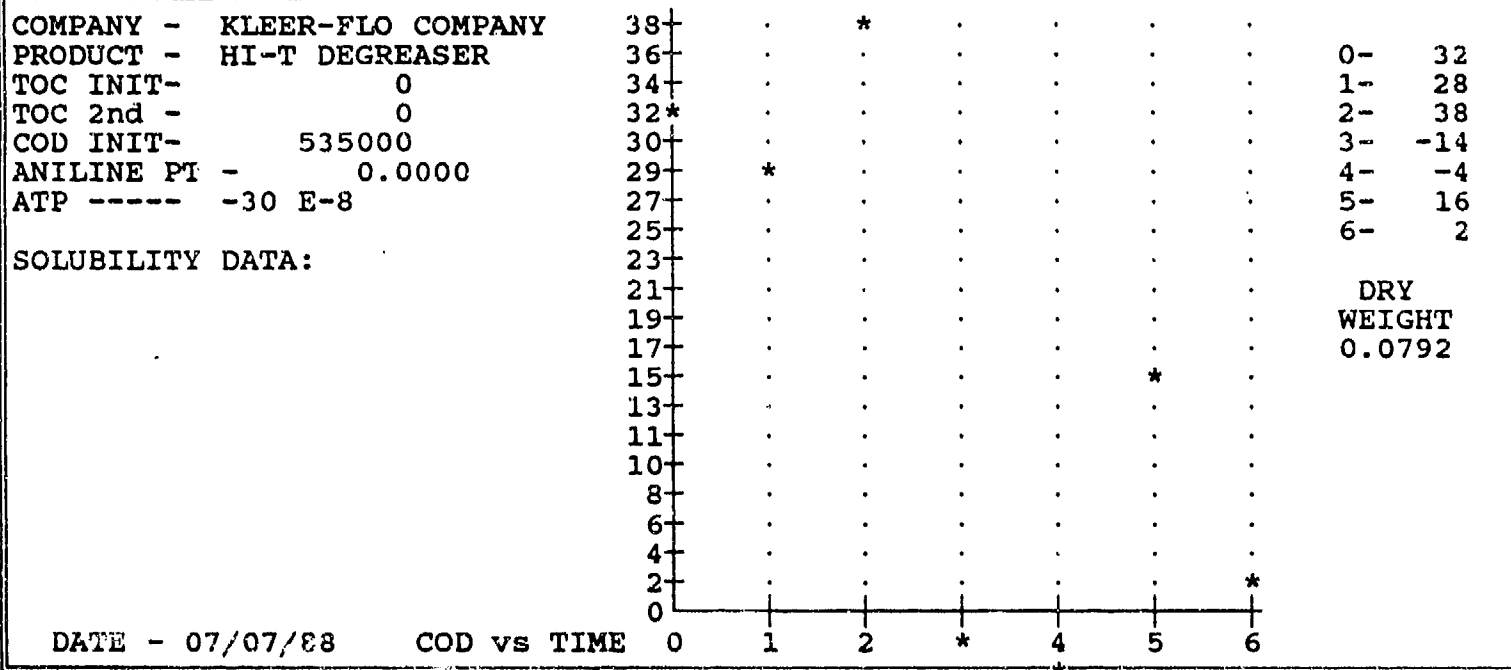
PACIFIC CHEMICAL
 FIST

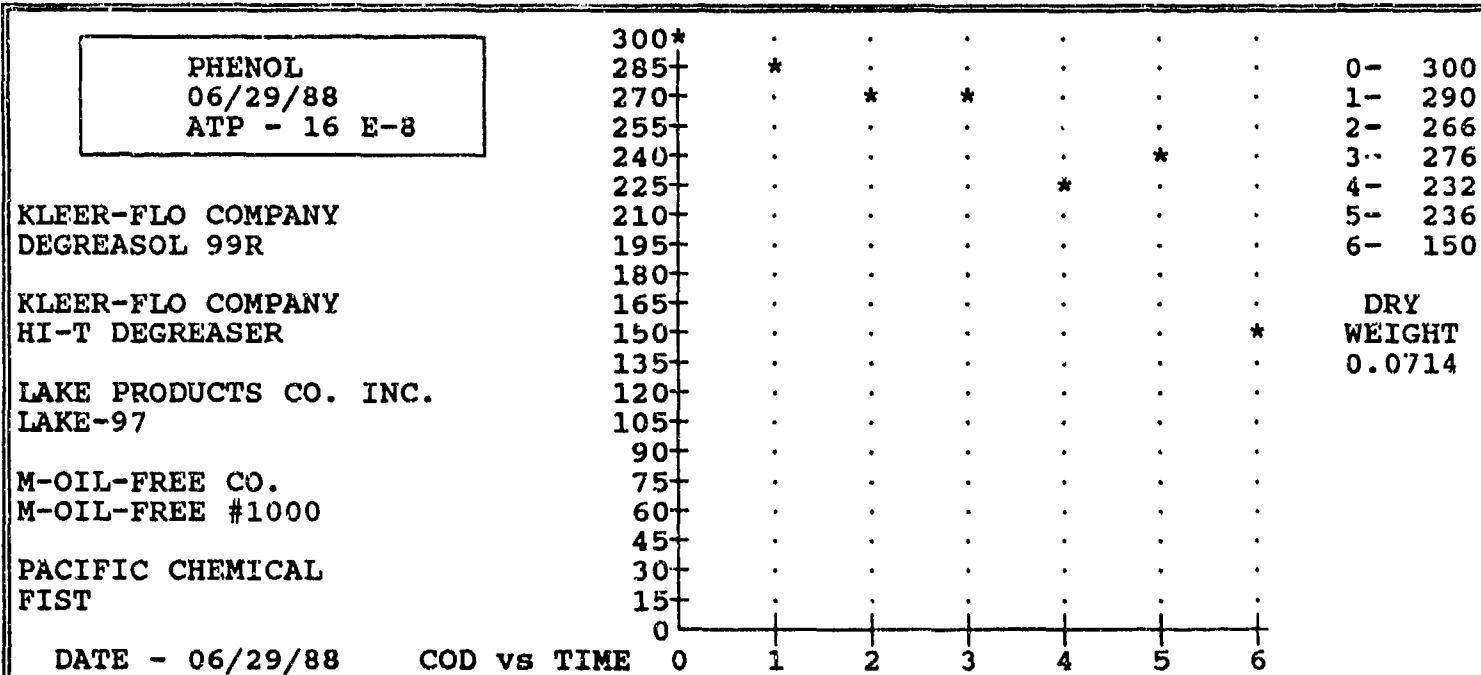
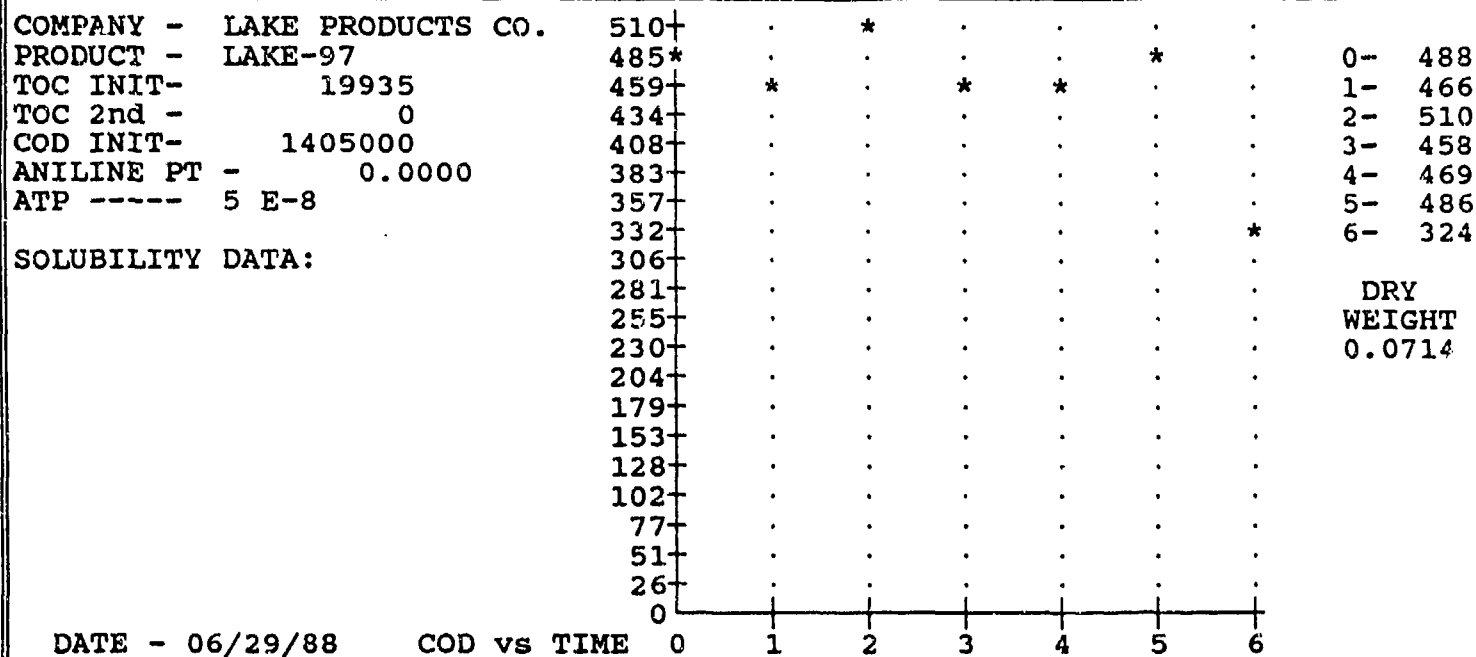


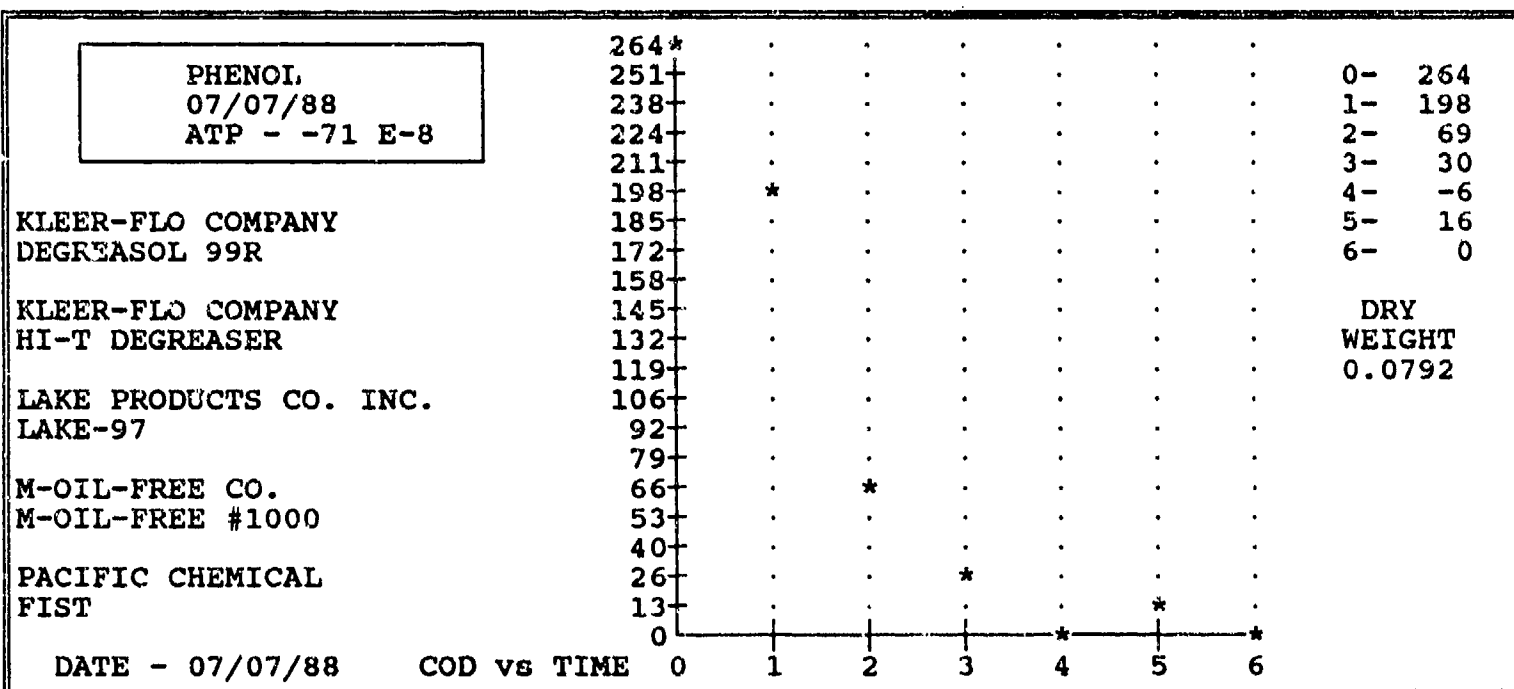
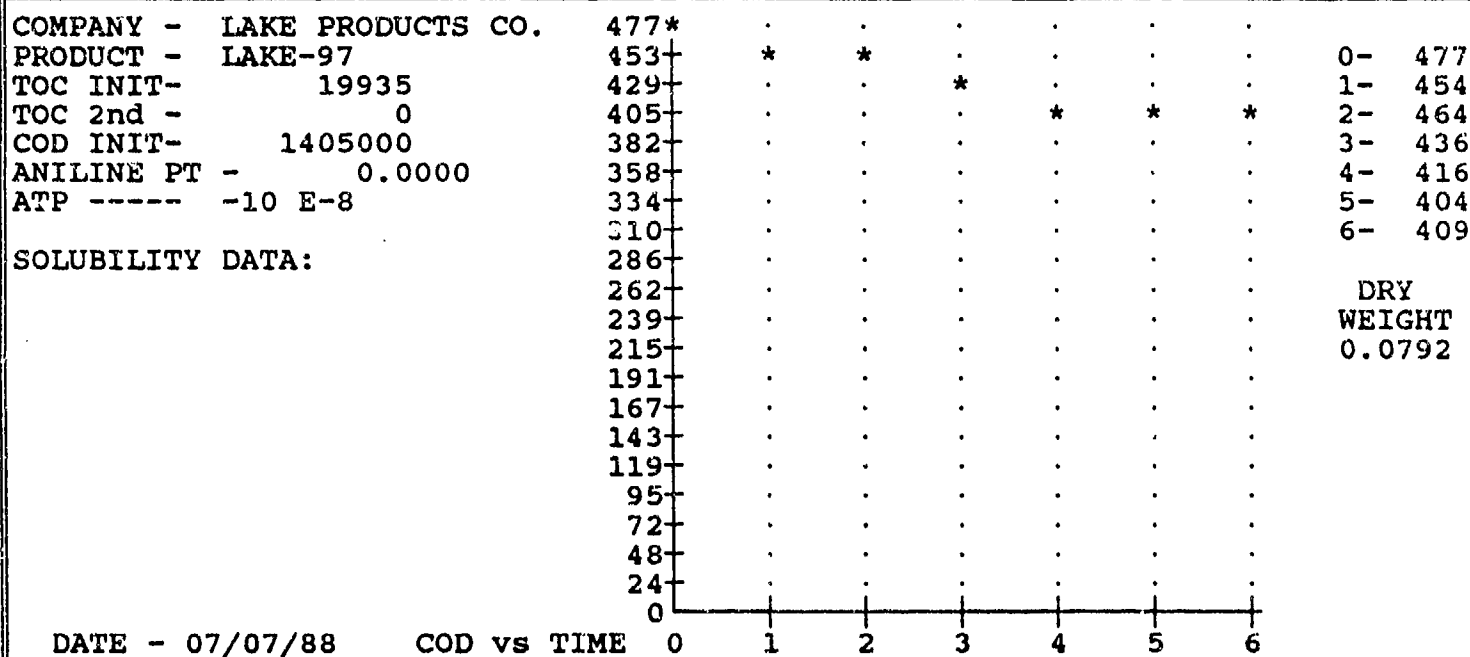
DATE - 06/29/88

COD vs TIME

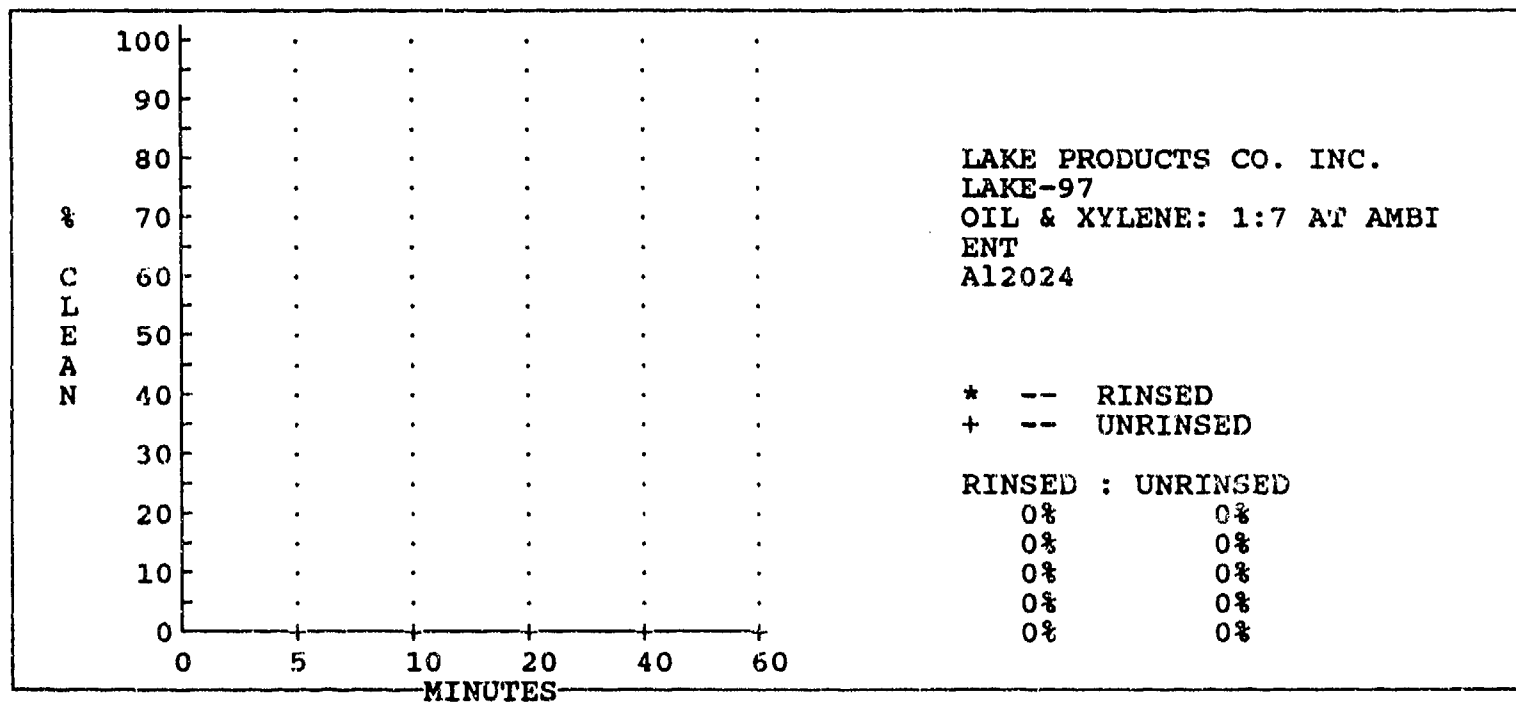
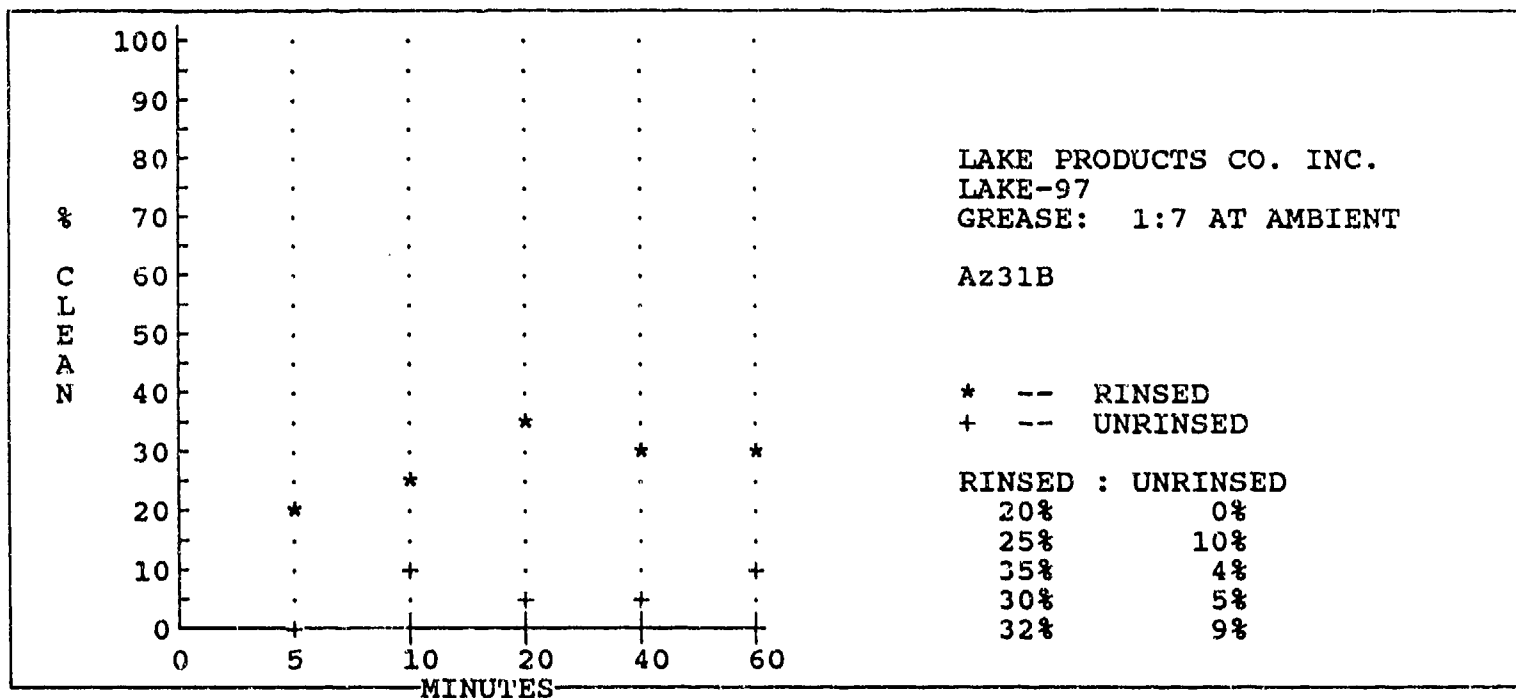
DRY
WEIGHT
0.0714

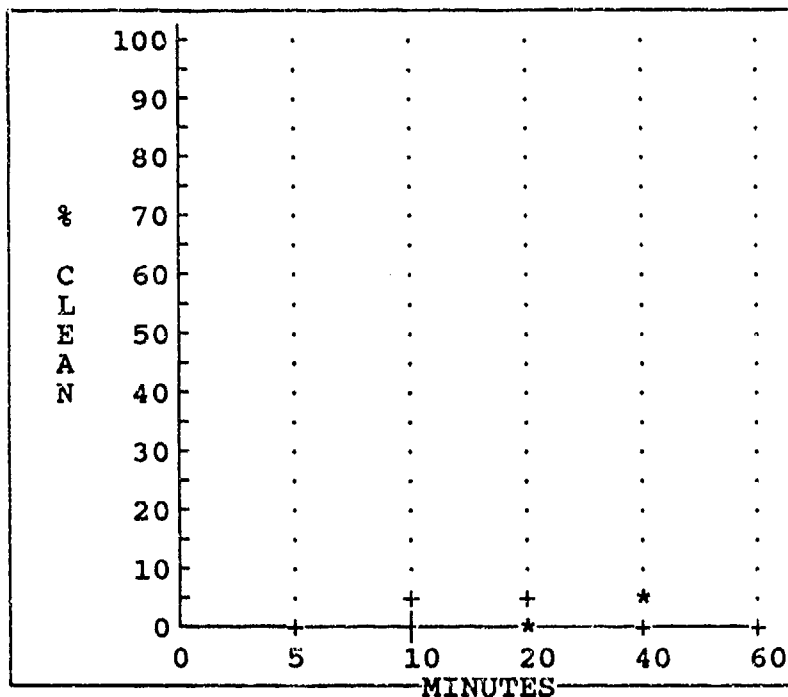






COMPANY - LAKE PRODUCTS CO.	538	+	*	.	*	*	.	.	
PRODUCT - LAKE-97	511	*	.	*	.	.	*	.	0- 506
TOC INIT- 19935	484	+	.	.	.	.	.	*	1- 534
TOC 2nd - 0	457	+	.	.	.	.	.	.	2- 520
COD INIT- 1405000	430	+	.	.	.	.	.	.	3- 534
ANILINE PT - 0.0000	404	+	.	.	.	.	.	.	4- 538
ATP ----- -14 E-8	377	+	.	.	.	.	.	.	5- 518
	350	+	.	.	.	.	.	.	6- 482
SOLUBILITY DATA:	323	+	.	.	.	.	.	.
	296	+	.	.	.	.	.	.	DRY
	269	+	.	.	.	.	.	.	WEIGHT
	242	+	.	.	.	.	.	.	0.0550
	215	+	.	.	.	.	.	.
	188	+	.	.	.	.	.	.
	161	+	.	.	.	.	.	.
	135	+	.	.	.	.	.	.
	108	+	.	.	.	.	.	.
	81	+	.	.	.	.	.	.
	54	+	.	.	.	.	.	.
	27	+	.	.	.	.	.	.
	0	+	.	.	.	.	.	.
DATE - 10/06/88	COD vs TIME	0	1	2	3	4	5	6	





LAKE PRODUCTS CO. INC.
 LAKE-97
 OIL/XYLENE: 1:7 AT 120 F
 MONEL K-500

* -- RINSED
 + -- UNRINSED

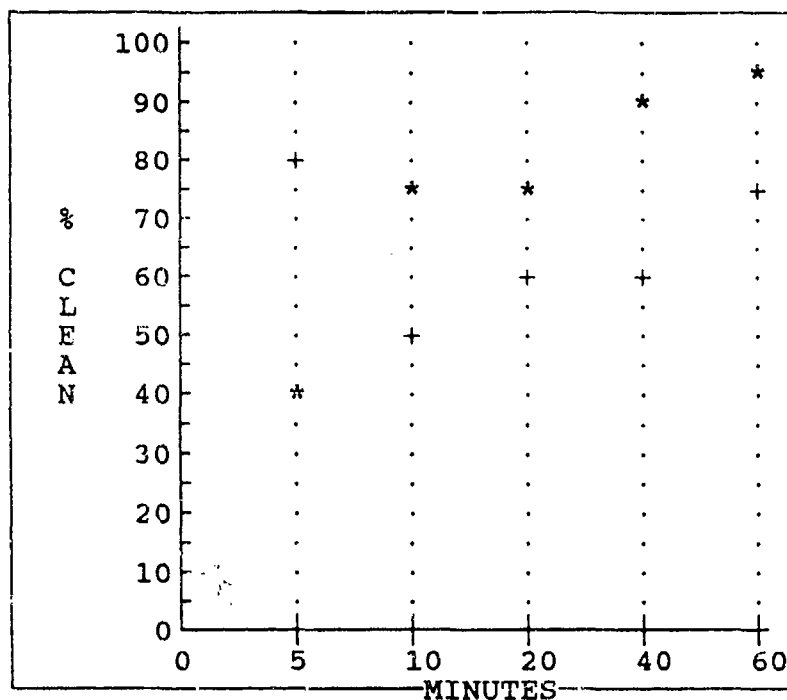
RINSED : UNRINSED	
0%	0%
6%	4%
0%	4%
4%	0%
1%	0%

COMPANY -	LEA MANUFACTURING	1650*	*	*	*	*	*	*	
PRODUCT -	CLEANOL	1568	.	.	.	.	.	.	0- 1650
TOC INIT-	379194	1485	.	.	.	.	.	.	1- 1650
TOC 2nd -	0	1403	.	.	.	.	.	.	2- 1650
COD INIT-	10940000	1320	.	.	.	.	.	.	3- 1650
ANILINE PT -	0.0000	1238	.	.	.	.	.	.	4- 1650
ATP -----	3 E-8	1155	.	.	.	.	.	.	5- 1650
		1073	.	.	.	.	.	.	6- 1650
SOLUBILITY DATA:		990	.	.	.	.	.	.
		908	.	.	.	.	.	.	DRY
		825	.	.	.	.	.	.	WEIGHT
		743	.	.	.	.	.	.	0.0594
		660	.	.	.	.	.	.
		578	.	.	.	.	.	.
		495	.	.	.	.	.	.
		413	.	.	.	.	.	.
		330	.	.	.	.	.	.
		248	.	.	.	.	.	.
		165	.	.	.	.	.	.
		83	.	.	.	.	.	.
		0	.	.	.	.	.	.

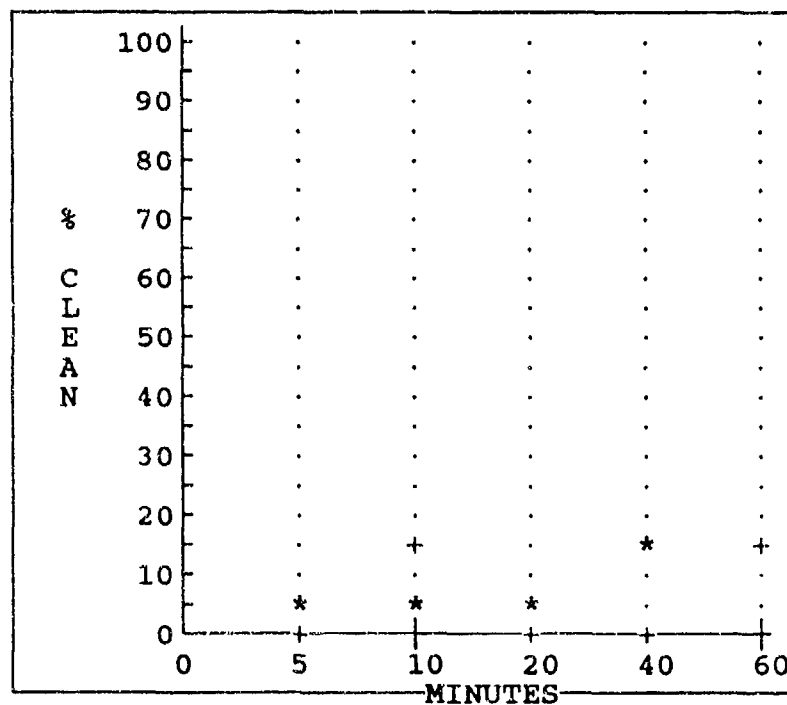
DATE - 06/28/88 COD vs TIME 0 1 2 3 4 5 6

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PHENOL 06/28/88 ATP - 72 E-8 </div>		346	*	
		329	.	.	.	.	.	0- 266
		311	.	.	.	.	.	1- 346
		294	.	.	.	.	.	2- 174
		277	.	.	.	.	.	3- 114
		260*	.	.	.	.	.	4- 28
HYLUBE INC.		242	.	.	.	.	.	5- 36
HYKLEEN 312		225	.	.	.	.	.	6- 12
		208	.	.	.	.	.
LEA MANUFACTURING CO.		190	.	.	.	.	.	DRY
CLEANOL		173	.	*	.	.	.	WEIGHT	
		156	.	.	.	.	.	0.0594
MEQQEM		138	.	.	.	.	.
MEQQEM-CLEAN 8512		121	.	.	*	.	.		
		104	.	.	.	.	.
MEQQEM		87	.	.	.	.	.
MEQQEM-CLEAN 8516		69	.	.	.	.	.
		52	.	.	.	.	.
PACIFIC CHEMICAL		35	.	.	.	*	*		
B-82		17	.	.	.	.	.	*
		0	.	.	.	.	.

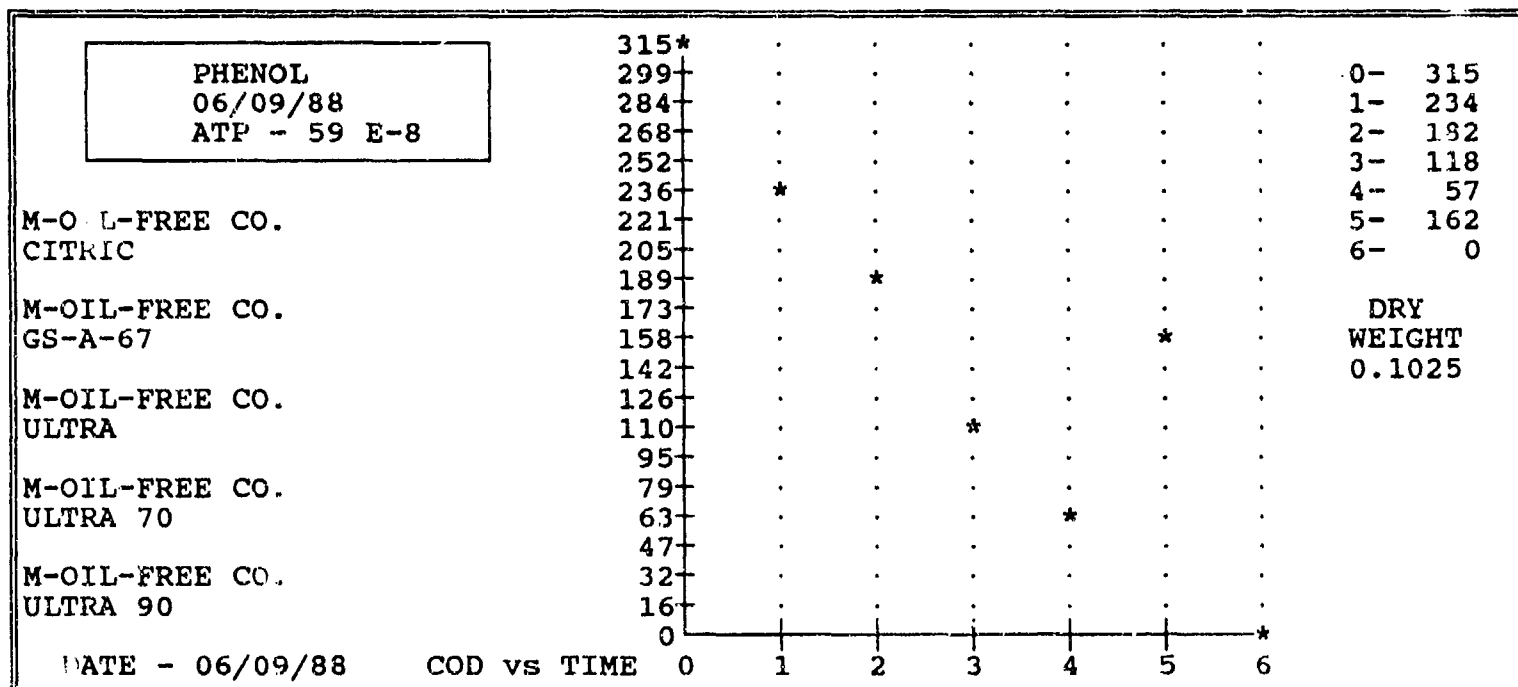
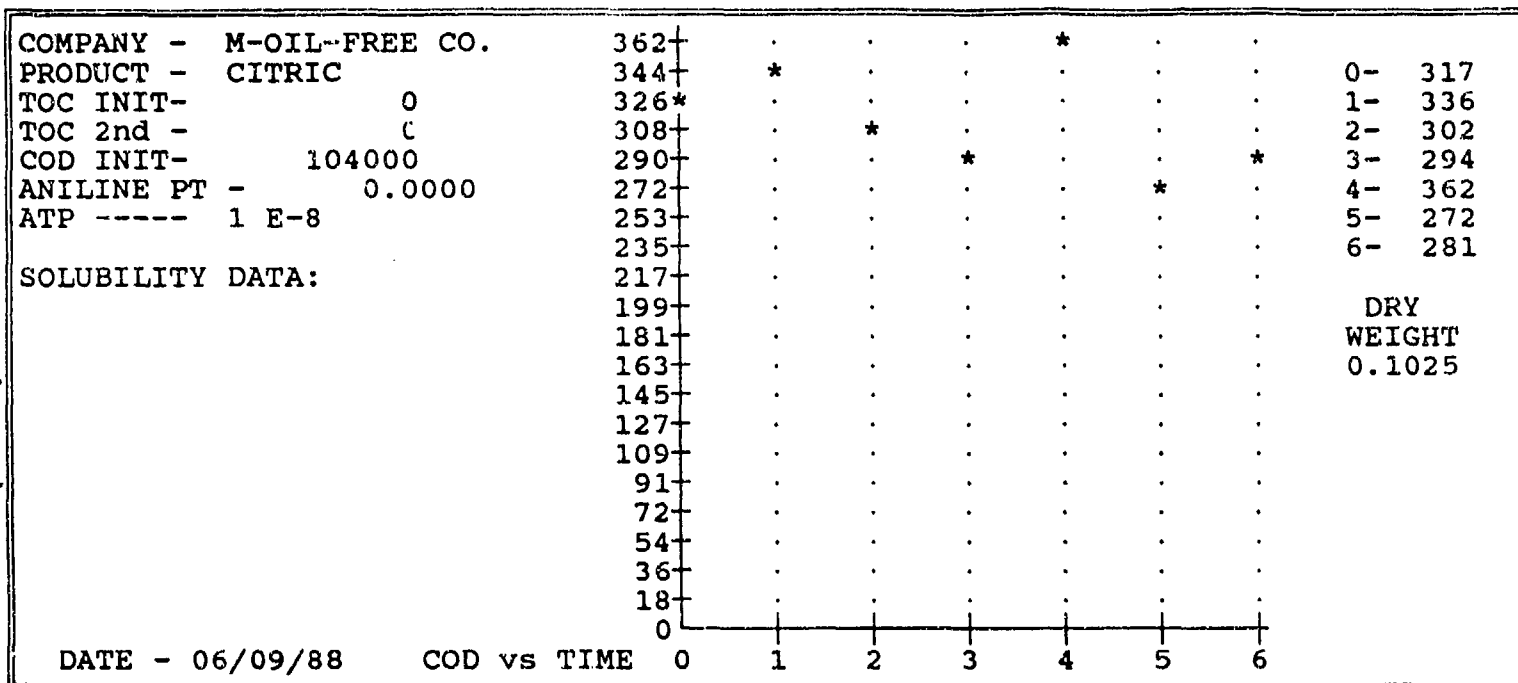
DATE - 06/28/88 COD vs TIME 0 1 2 3 4 5 6

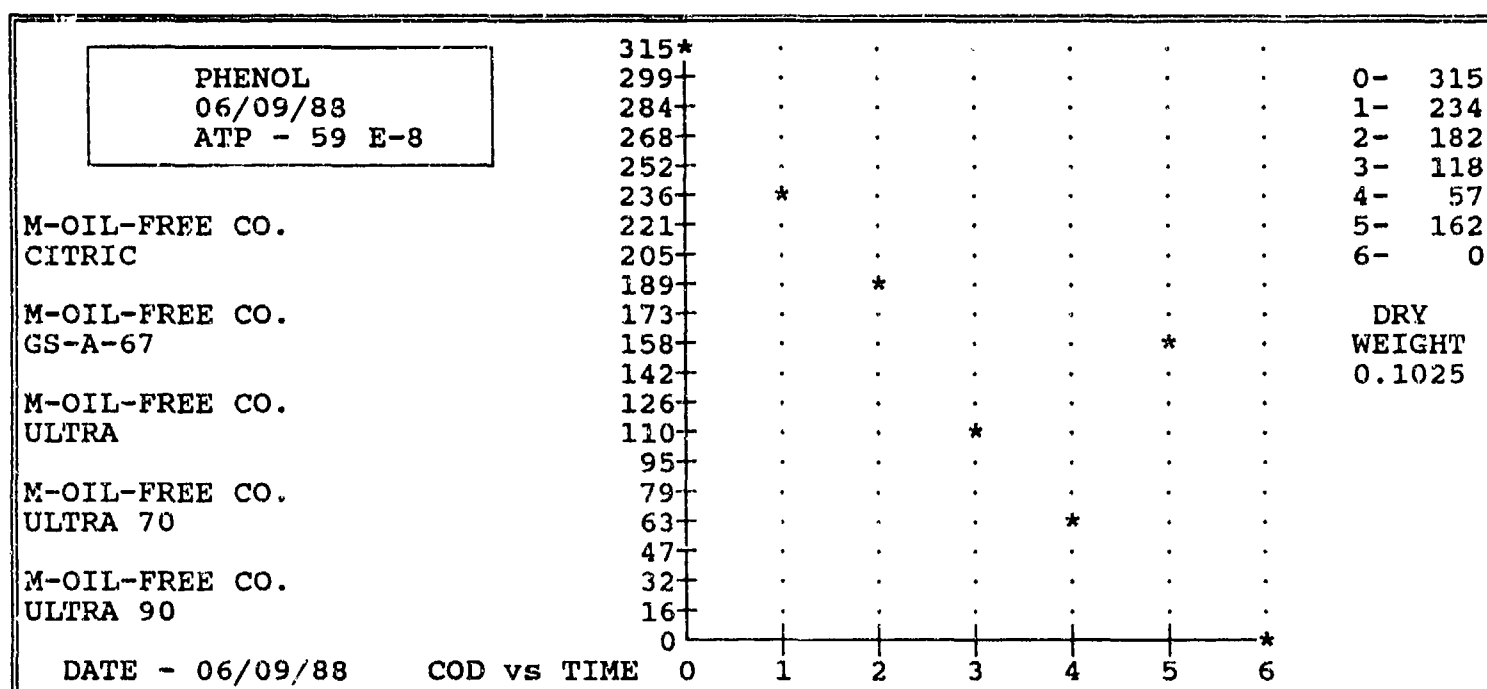
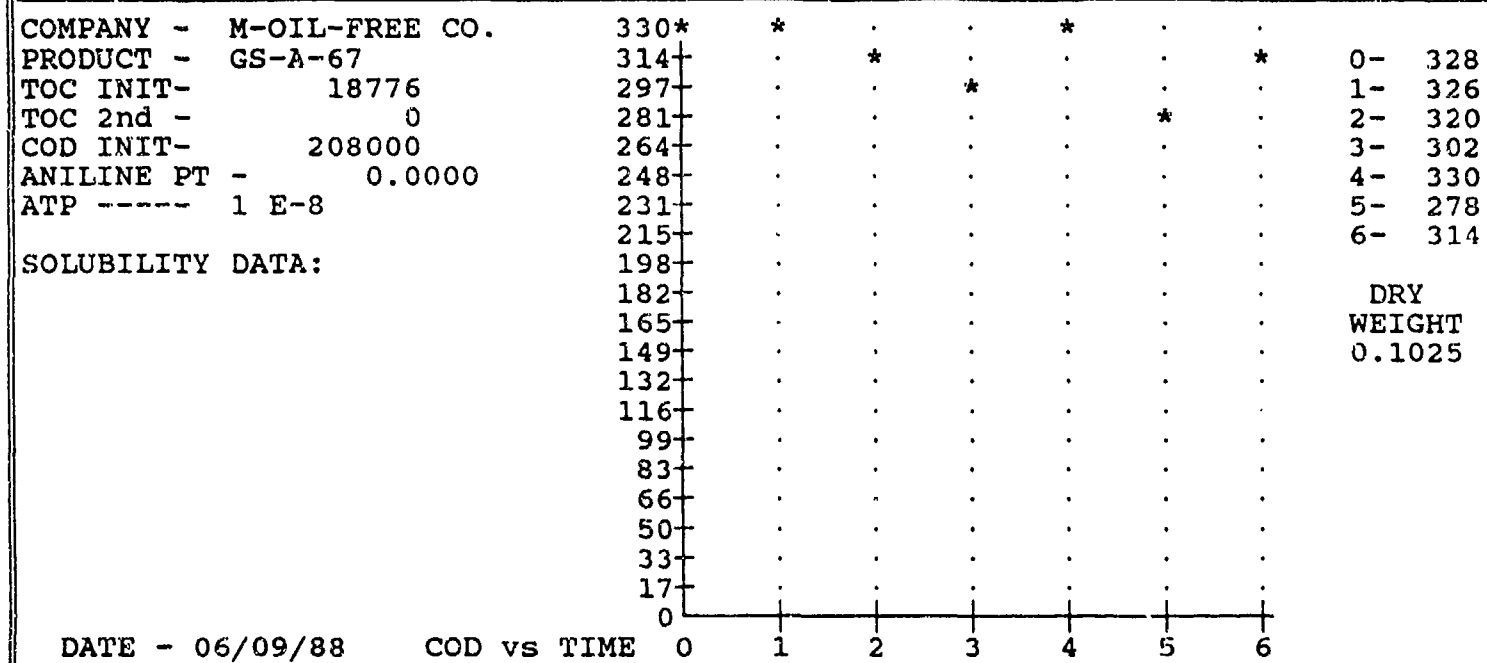


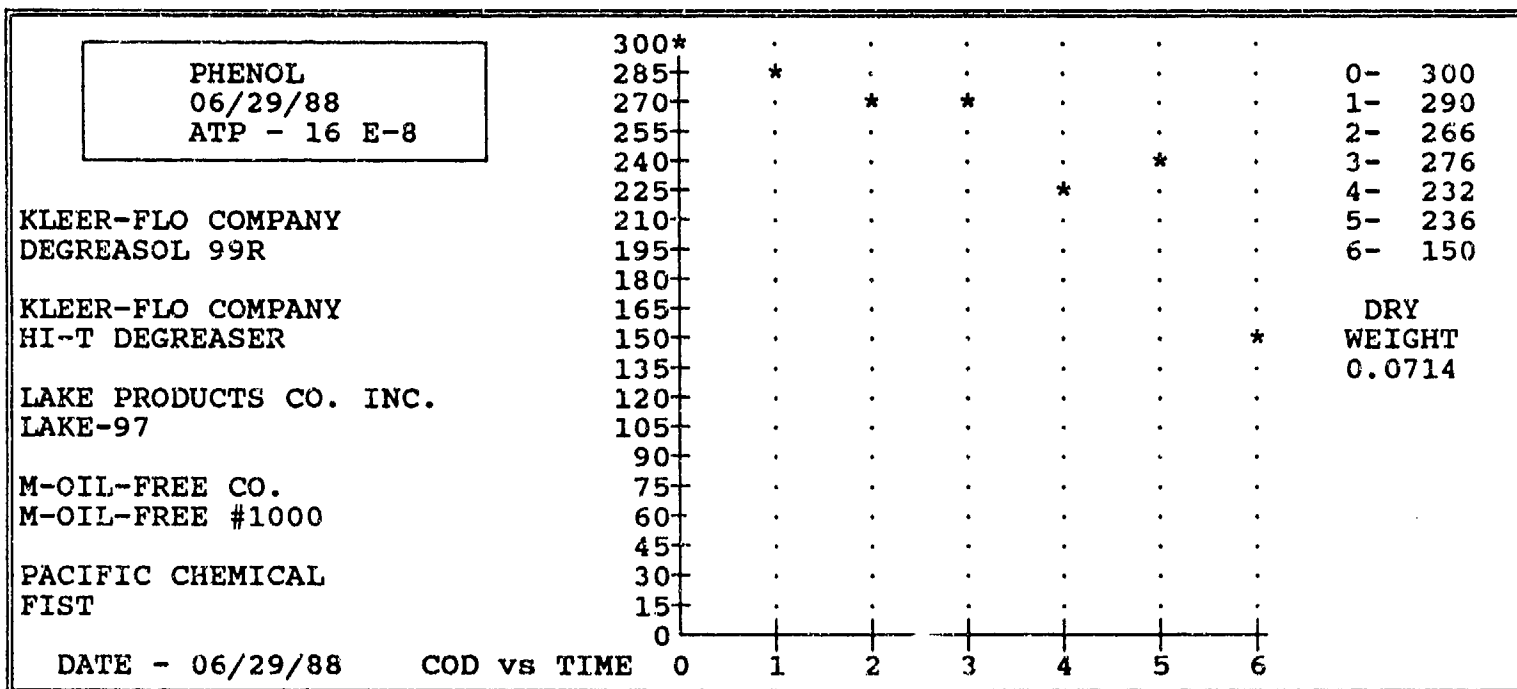
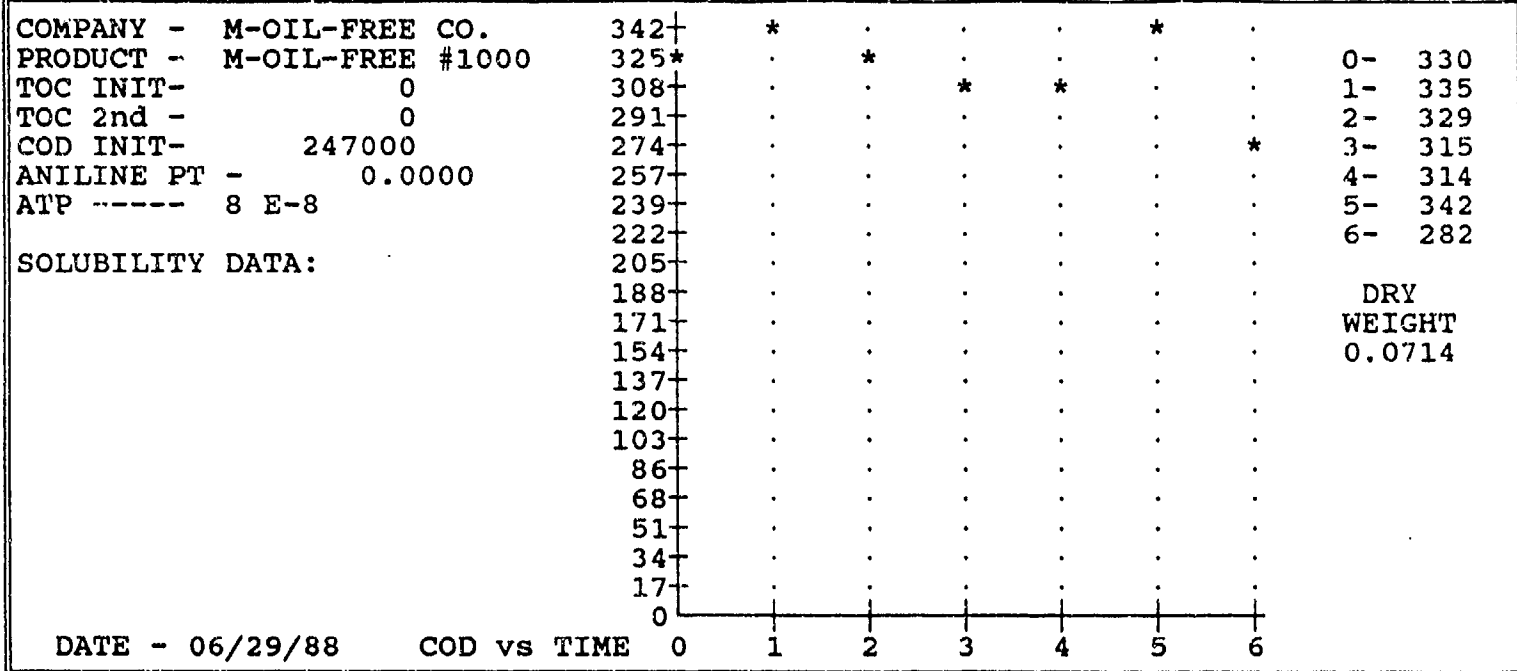
RINSED : UNRINSED
 41% : 79%
 77% : 48%
 76% : 59%
 89% : 61%
 95% : 75%



RINSED : UNRINSED
 5% : 0%
 3% : 16%
 4% : 3%
 17% : 2%
 14% : 16%







COMPANY - M-OIL-FREE CO.	341	*	*	.	.	.	.
PRODUCT - M-OIL-FREE #1000	324	.	.	.	.	*	.	0-	305
TOC INIT- 0	307*	.	.	*	.	.	.	1-	341
TOC 2nd - 0	290	.	.	.	.	.	*	2-	335
COD INIT- 247000	273	.	.	.	*	.	.	3-	300
ANILINE PT - 0.0000	256	.	.	.	.	.	.	4-	278
ATP ----- -20 E-8	239	.	.	.	.	.	.	5-	320
	222	.	.	.	.	.	.	6-	288
SOLUBILITY DATA:	205	.	.	.	.	.	.
	188	.	.	.	.	.	.
	171	.	.	.	.	.	.	DRY	
	153	.	.	.	.	.	.	WEIGHT	
	136	.	.	.	.	.	.	0.0792	
	119	.	.	.	.	.	.
	102	.	.	.	.	.	.
	85	.	.	.	.	.	.
	68	.	.	.	.	.	.
	51	.	.	.	.	.	.
	34	.	.	.	.	.	.
	17	.	.	.	.	.	.
	0	.	.	.	.	.	.

DATE - 07/07/88 COD vs TIME 0 1 2 3 4 5 6

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PHENOL 07/07/88 ATP - -71 E-8 </div>	264*	0-	264
	251	1-	198
	238	2-	69
	224	3-	30
	211	4-	-6
	198	*	5-	16
	185	6-	0
	172		
	158		
	145	DRY	
KLEER-FLO COMPANY	132	.	.	.	.	.	WEIGHT	
DEGREASOL 99R	119	.	.	.	.	.	0.0792	
KLEER-FLO COMPANY	106	.	.	.	.	.
HI-T DEGREASER	92	.	.	.	.	.
LAKE PRODUCTS CO. INC.	79	.	.	.	.	.
LAKE-97	66	.	*	.	.	.			
M-OIL-FREE CO.	53	.	.	.	.	.
M-OIL-FREE #1000	40	.	.	.	.	.
PACIFIC CHEMICAL	26	.	.	*	.	.			
FIST	13	.	.	.	.	*
	0	.	.	.	*	.	*		

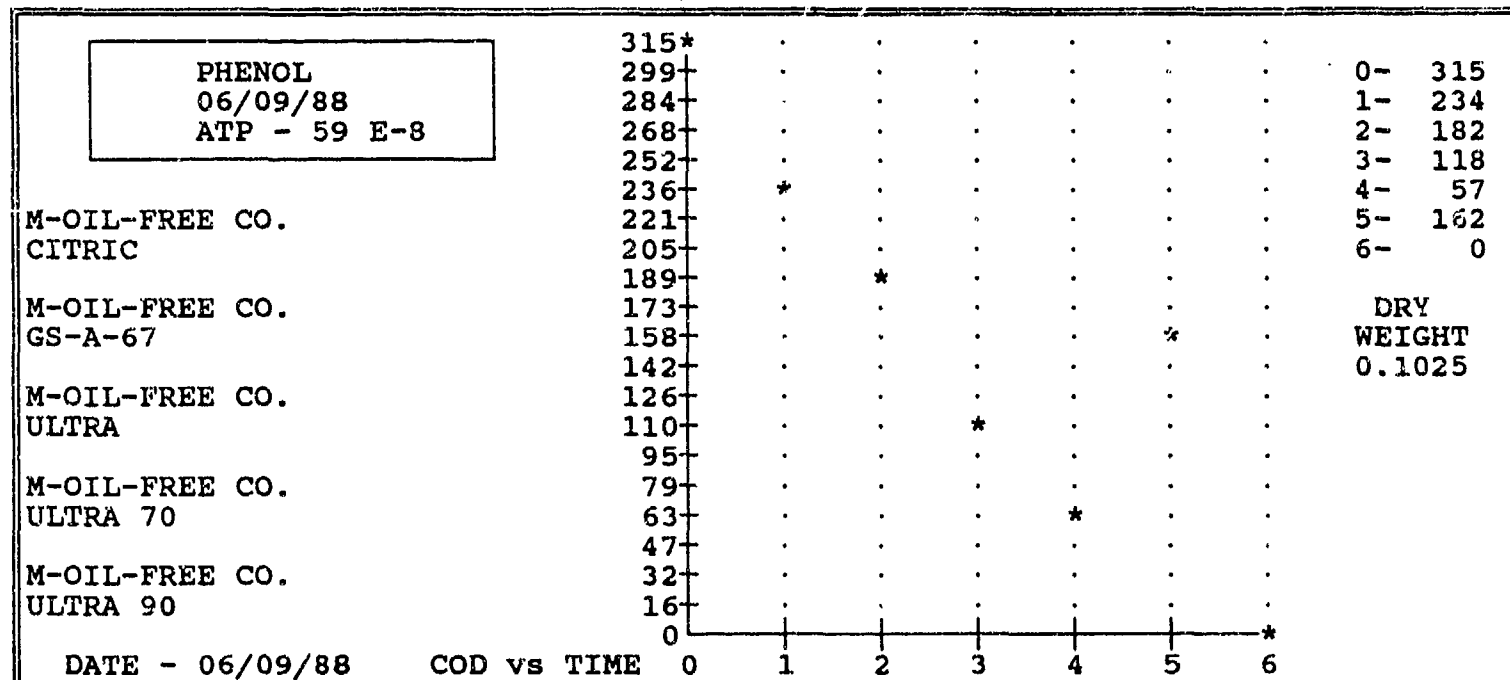
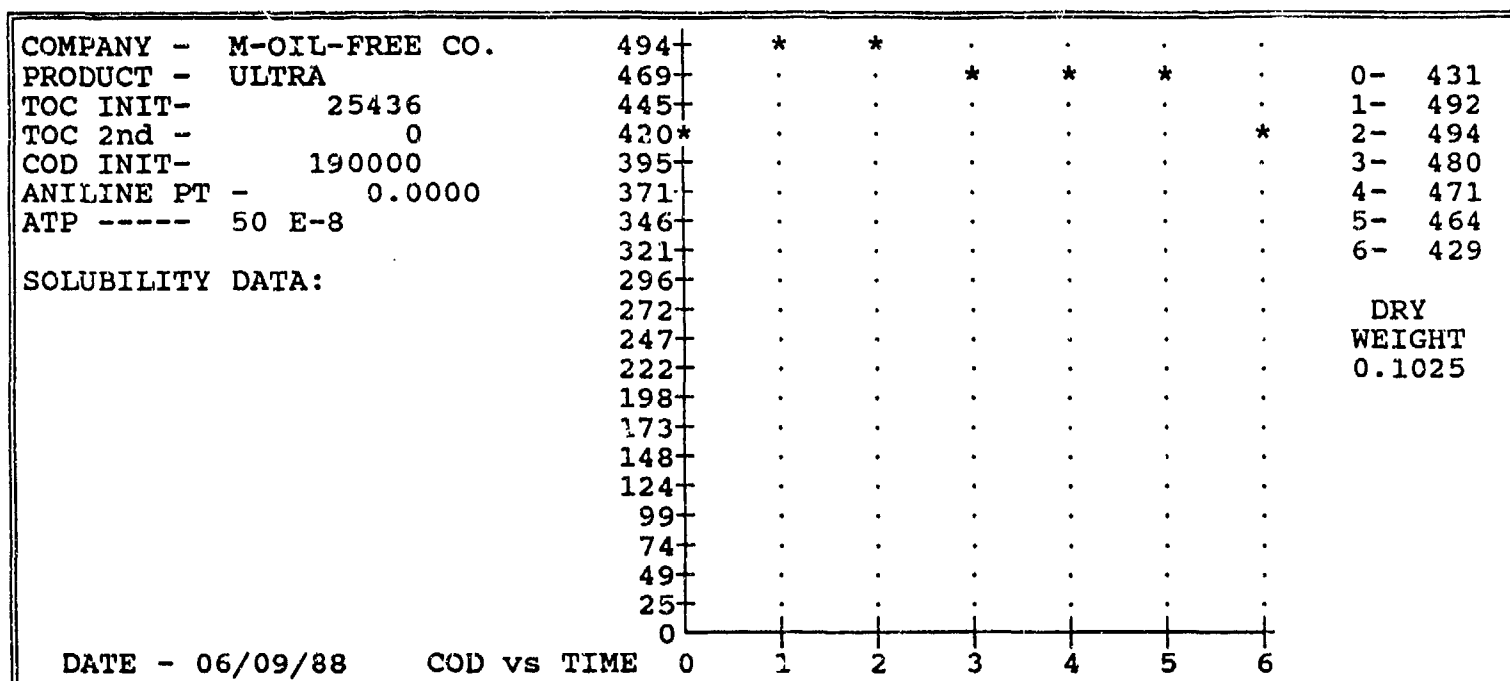
DATE - 07/07/88 COD vs TIME 0 1 2 3 4 5 6

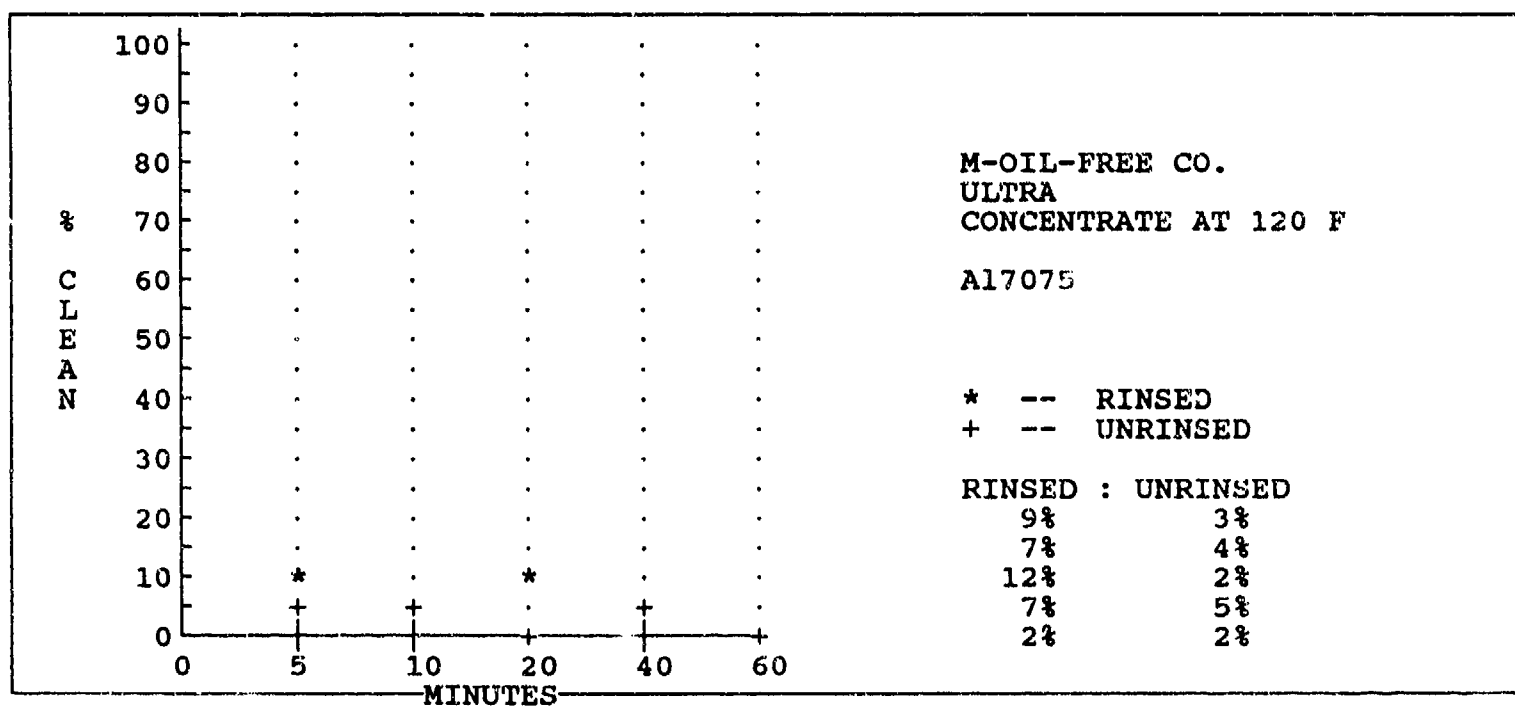
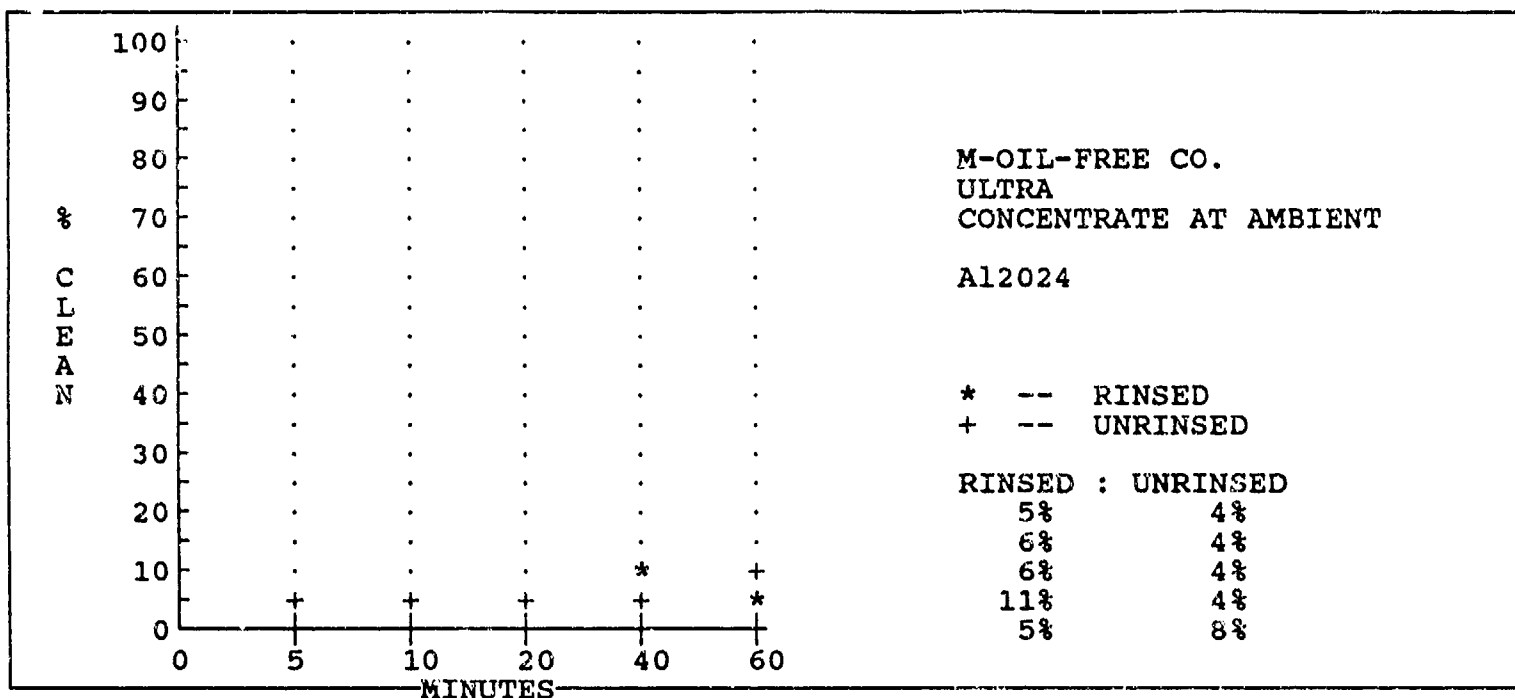
COMPANY - M-OIL-FREE CO.	358	.	.	*	.	.	.	
PRODUCT - M-OIL-FREE #1000	340	.	.	.	.	.	.	0- 283
TOC INIT- 0	322	.	*	.	.	.	.	1- 292
TOC 2nd - 0	304	.	.	.	*	*	.	2- 323
COD INIT- 247000	286*	*	.	.	.	.	.	3- 358
ANILINE PT - 0.0000	269	.	.	.	.	.	.	4- 306
ATP ----- -2 E-8	251	.	.	.	.	.	.	5- 313
	233	.	.	.	.	.	*	6- 236
SOLUBILITY DATA:	215	.	.	.	.	.	.
	197	.	.	.	.	.	.	DRY
	179	.	.	.	.	.	.	WEIGHT
	161	.	.	.	.	.	.	0.0554
	143	.	.	.	.	.	.
	125	.	.	.	.	.	.
	107	.	.	.	.	.	.
	90	.	.	.	.	.	.
	72	.	.	.	.	.	.
	54	.	.	.	.	.	.
	36	.	.	.	.	.	.
	18	.	.	.	.	.	.
	0	.	.	.	.	.	.

DATE - 10/11/88 COD vs TIME 0 1 2 3 4 5 6

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PHENOL 10/11/88 ATP - 79 E-8 </div>	262*	*	.	.	.	.	.
	249	.	.	.	.	.	.	0- 258
	236	.	*	.	.	.	.	1- 262
	223	.	.	.	.	.	.	2- 236
	210	.	.	.	.	.	.	3- 189
	197	.	.	.	.	.	.	4- 140
M-OIL-FREE CO.	183	.	.	*	.	.	.	5- -24
M-OIL-FREE #1000	170	.	.	.	.	.	.	6- 36
	157	.	.	.	.	.	.
M-OIL-FREE CO.	144	.	.	.	*	.	.	DRY
ULTRA 1	131	.	.	.	.	.	.	WEIGHT
	118	.	.	.	.	.	.	0.0554
PACIFIC CHEMICAL	105	.	.	.	.	.	.
FIST	92	.	.	.	.	.	.
	79	.	.	.	.	.	.
VAN STRAATEN CHEM CO.	66	.	.	.	.	.	.
3625	52	.	.	.	.	.	.
	39	.	.	.	.	.	*
	26	.	.	.	.	.	.
	13	.	.	.	.	.	.
	0	.	.	.	.	.	.

DATE - 10/11/88 COD vs TIME 0 1 2 3 4 5 6





COMPANY -	M-OIL-FREE CO.	509	.	.	.	.	.	*
PRODUCT -	ULTRA 1	484	*	.	*	.	.	.	0- 222
TOC INIT-	0	458	.	*	.	*	.	.	1- 486
TOC 2nd -	0	433	.	.	.	.	.	.	2- 449
COD INIT-	0	407	.	.	.	.	.	.	3- 495
ANILINE PT -	0.0000	382	.	.	.	.	.	.	4- 454
ATP -----	25 E-8	356	.	.	.	.	.	.	5- 220
		331	.	.	.	.	.	.	6- 509
SOLUBILITY DATA:		305	.	.	.	.	.	.
		280	.	.	.	.	.	.	DRY
		255	.	.	.	.	.	.	WEIGHT
		229*	.	.	.	.	*	.	0.0621
		204	.	.	.	.	.	.
		178	.	.	.	.	.	.
		153	.	.	.	.	.	.
		127	.	.	.	.	.	.
		102	.	.	.	.	.	.
		76	.	.	.	.	.	.
		51	.	.	.	.	.	.
		25	.	.	.	.	.	.
		0	.	.	.	.	.	.
DATE -	07/06/88	COD vs TIME	0	1	2	3	4	5	6

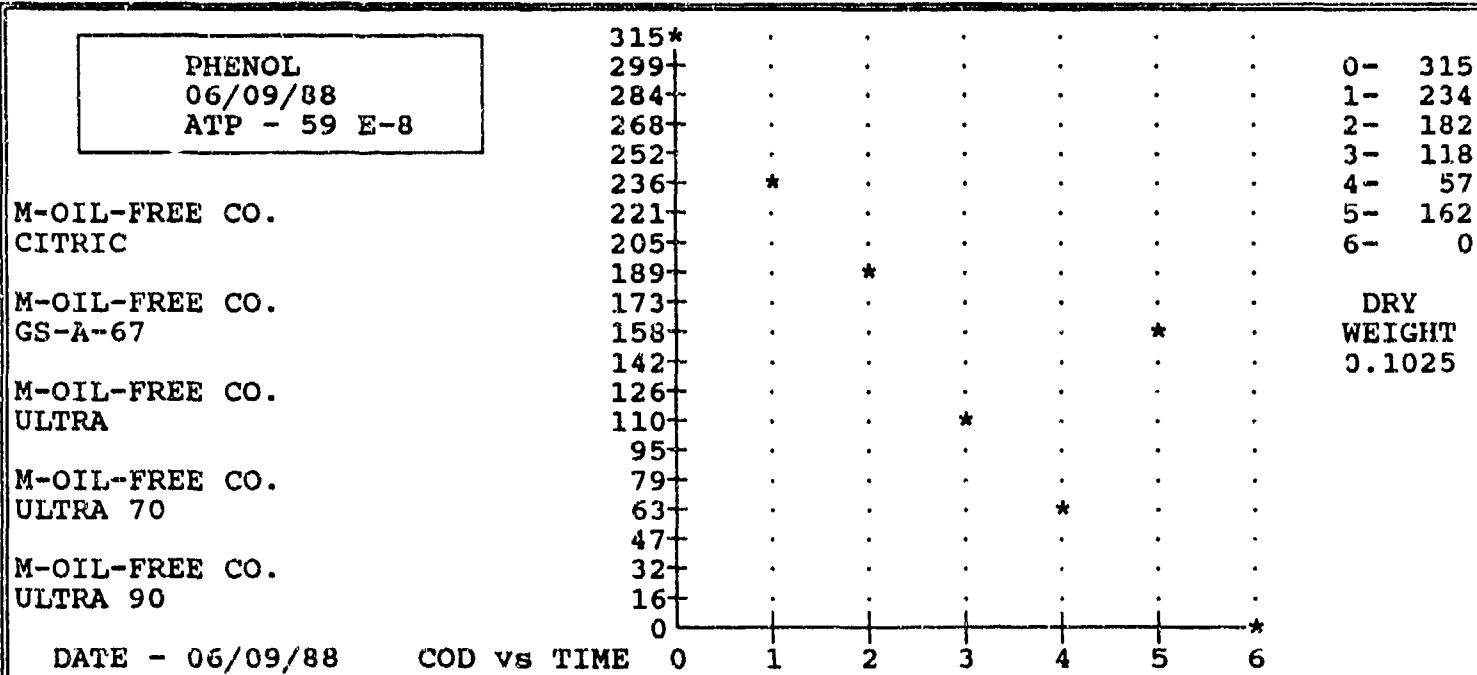
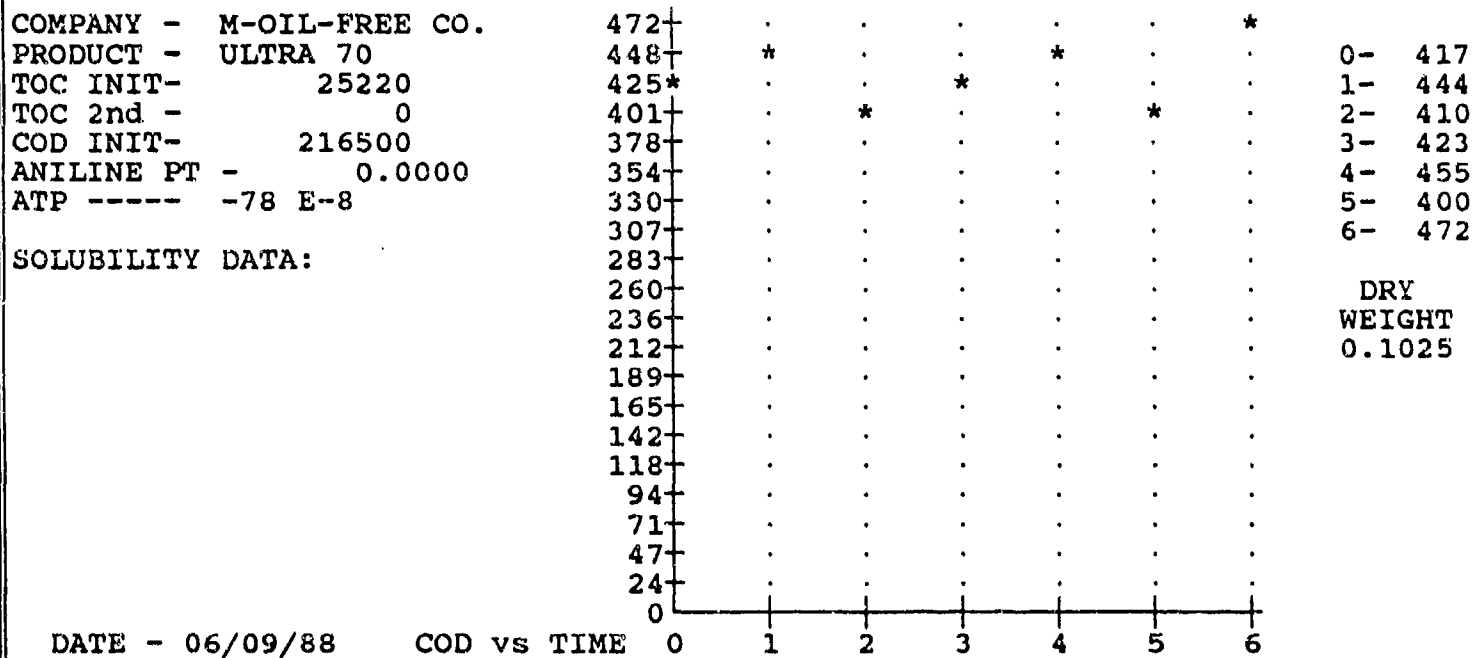
PHENOL	256*	.	.	.	.	.	*	0- 256
07/06/88	243	.	.	*	.	.	*	1- 230
ATP - 72 E-8	230	*	*	.	.	.	.	2- 228
	218	.	.	.	.	.	.	3- 246
	205	.	.	.	.	.	.	4- 194
	192	.	.	.	*	*	.	5- 186
CITRI-KLEEN	179	.	.	.	.	.	.	6- 244
	166	.	.	.	.	.	.
	154	.	.	.	.	.	.
FREDERICK GUMM CHEM.	141	.	.	.	.	.	.	DRY
ELECTROSTRIP B	128	.	.	.	.	.	.	WEIGHT
	115	.	.	.	.	.	.	0.0621
M-OIL-FREE CO.	102	.	.	.	.	.	.
ULTRA 1	90	.	.	.	.	.	.
	77	.	.	.	.	.	.
MAN-GILL CHEMICAL	64	.	.	.	.	.	.
MAGNUSOL 728	51	.	.	.	.	.	.
	38	.	.	.	.	.	.
PENETONE	26	.	.	.	.	.	.
CITRI KLEEN	13	.	.	.	.	.	.
	0	.	.	.	.	.	.
TITAN CHEMICAL	vs TIME	0	1	2	3	4	5	6
OIL-FLO								

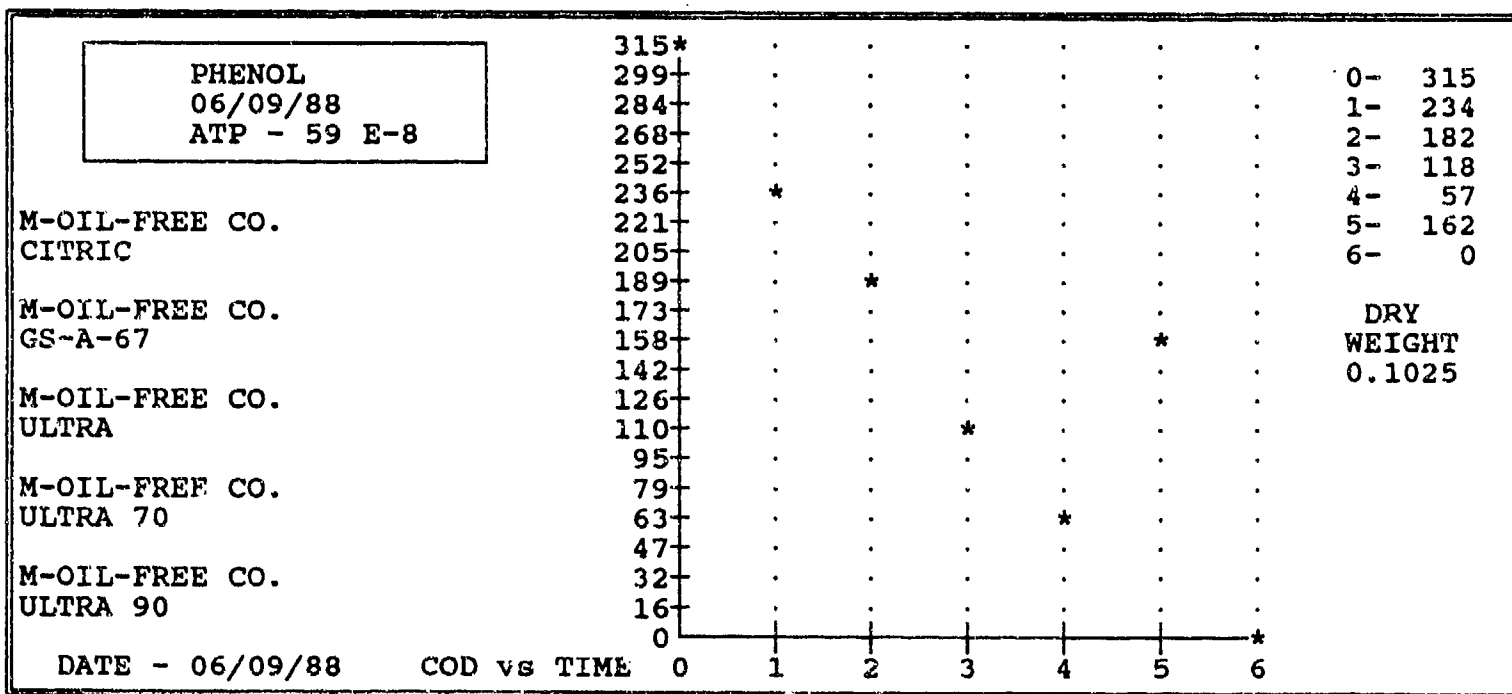
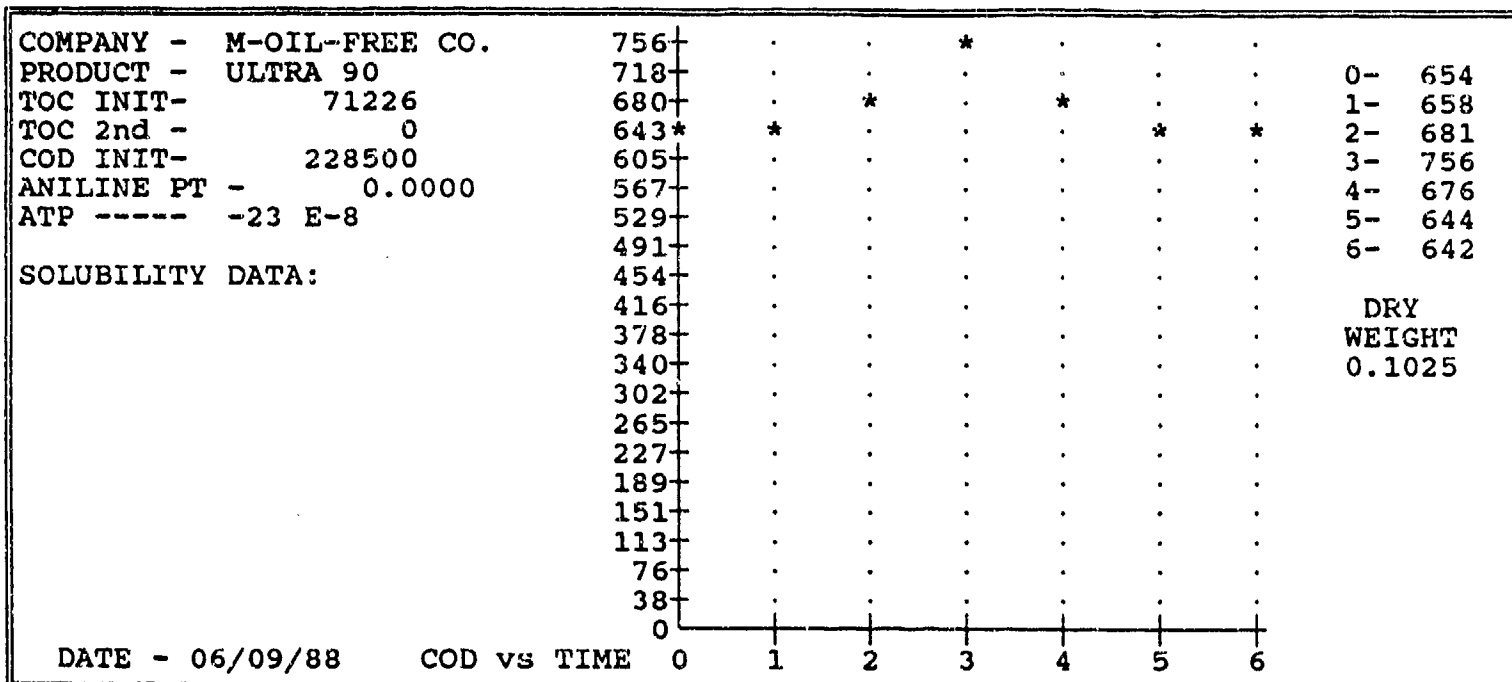
COMPANY - M-OIL-FREE CO.	481	*	.	.	.	.	.
PRODUCT - ULTRA 1	457	.	*	*	*	.	.	0- 413
TOC INIT- 0	433	.	.	.	.	.	.	1- 481
TOC 2nd - 0	409*	.	.	.	.	.	.	2- 457
COD INIT- 0	385	.	.	.	.	.	*	3- 462
ANILINE PT - 0.0000	361	.	.	.	.	*	.	4- 448
ATP ----- 19 E-8	337	.	.	.	.	.	.	5- 358
	313	.	.	.	.	.	.	6- 382
SOLUBILITY DATA:	289	.	.	.	.	.	.
	265	.	.	.	.	.	.	DRY
	241	.	.	.	.	.	.	WEIGHT
	216	.	.	.	.	.	.	0.0554
	192	.	.	.	.	.	.
	168	.	.	.	.	.	.
	144	.	.	.	.	.	.
	120	.	.	.	.	.	.
	96	.	.	.	.	.	.
	72	.	.	.	.	.	.
	48	.	.	.	.	.	.
	24	.	.	.	.	.	.
	0	.	.	.	.	.	.

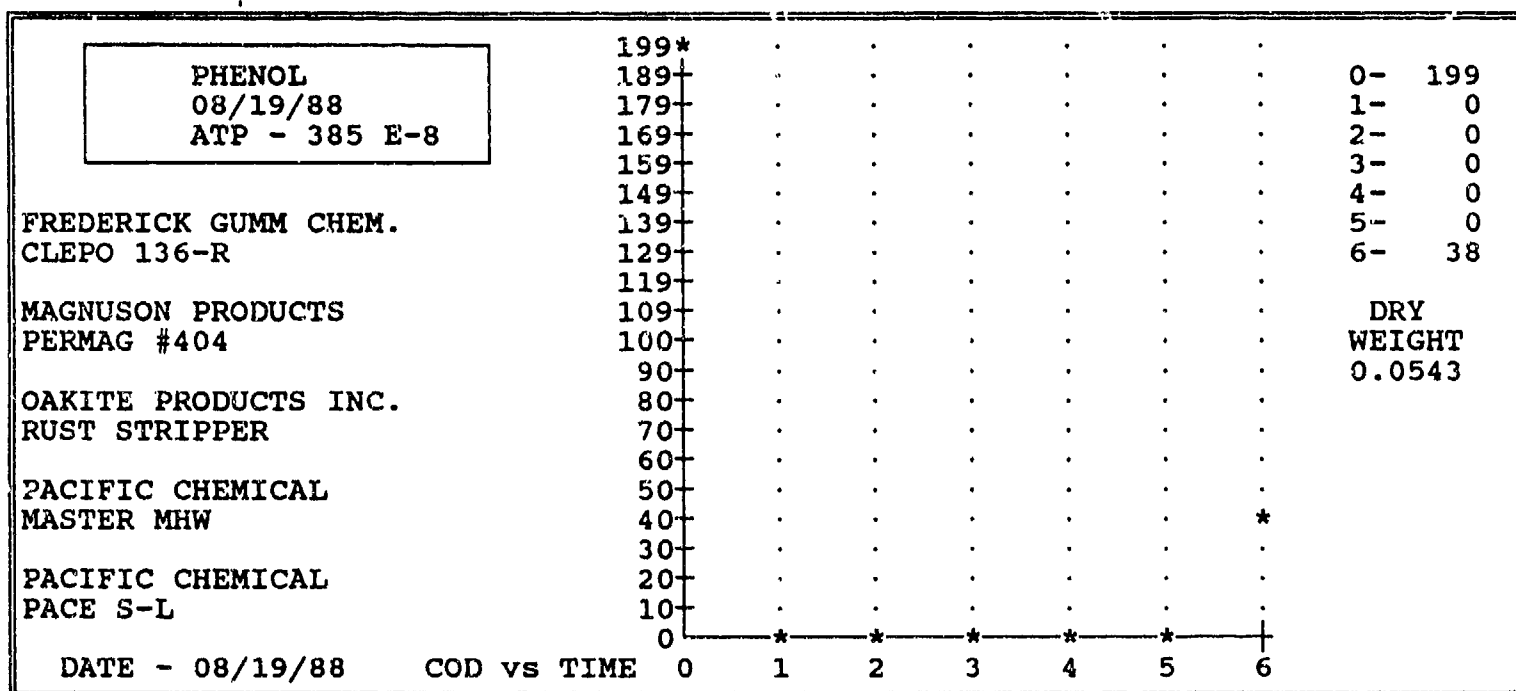
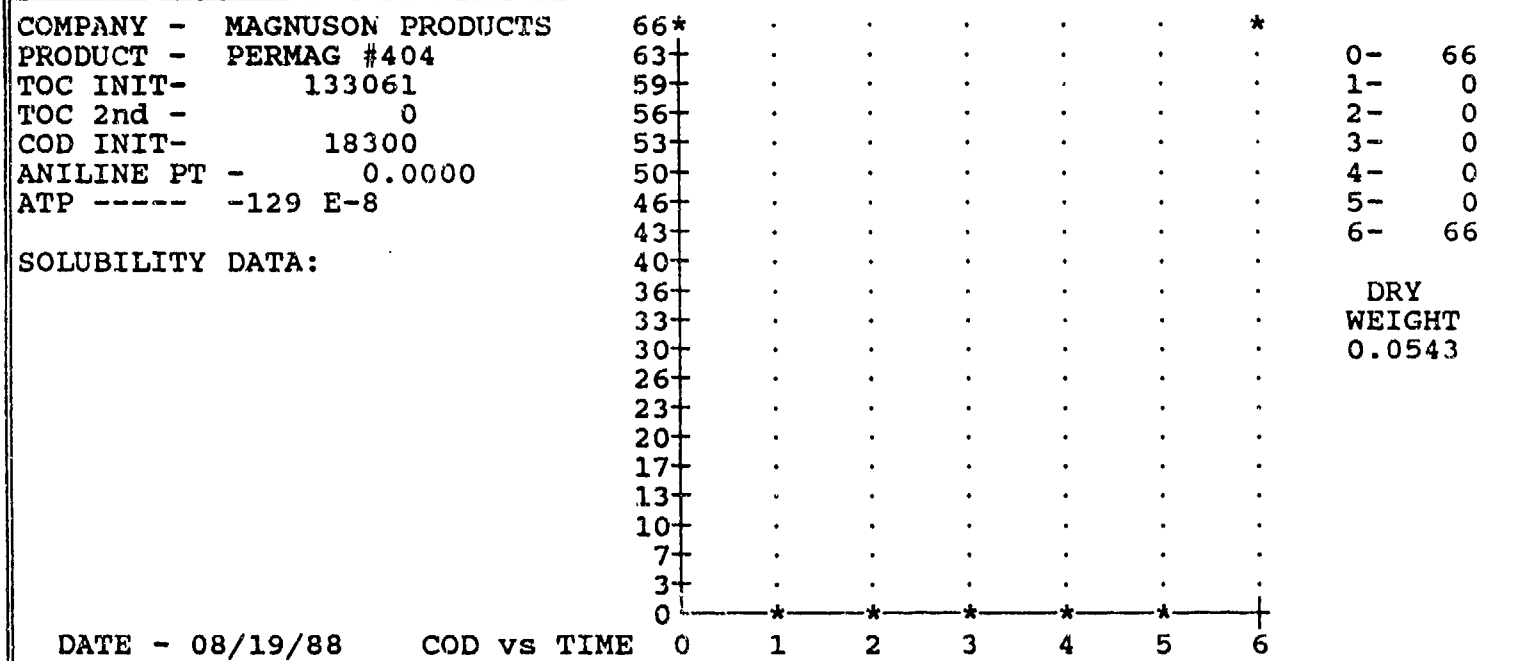
DATE - 10/11/88 COD vs TIME 0 1 2 3 4 5 6

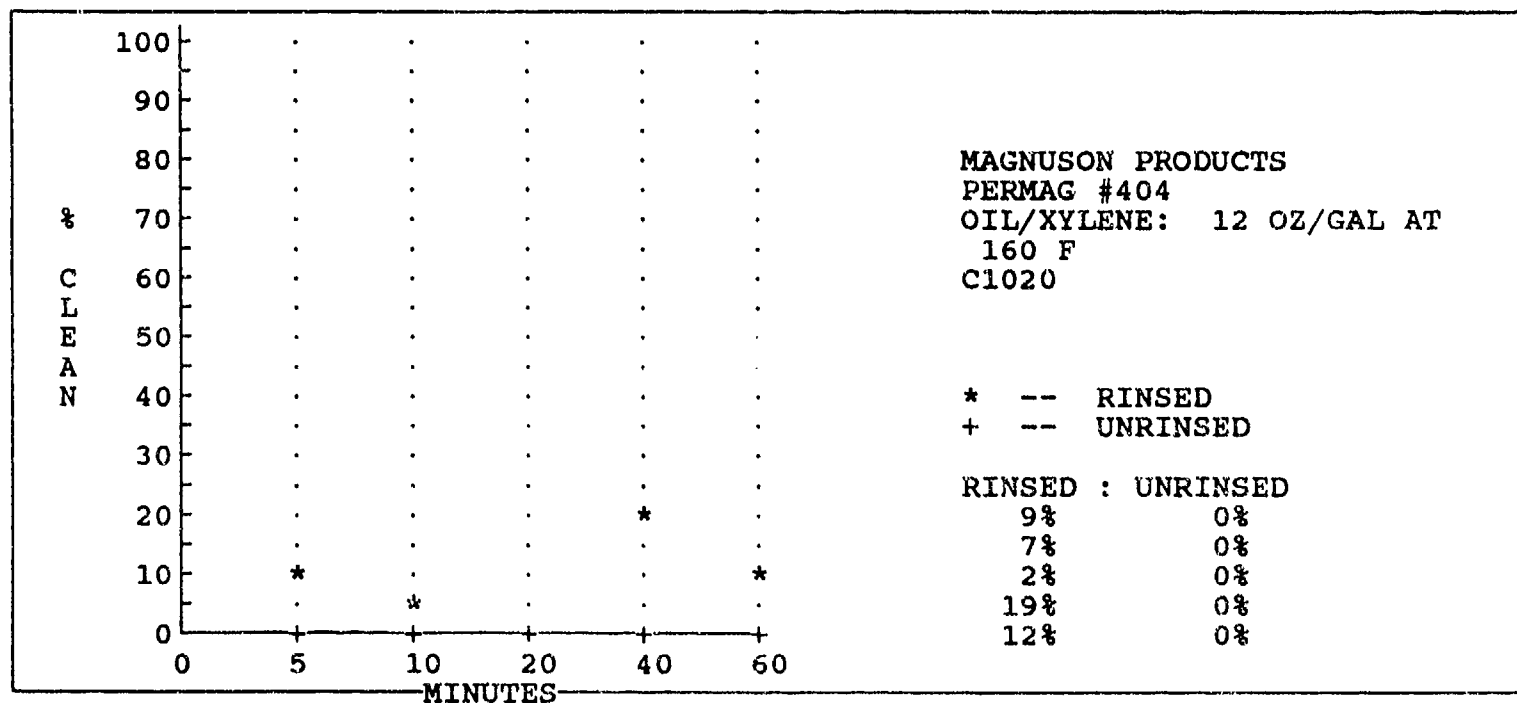
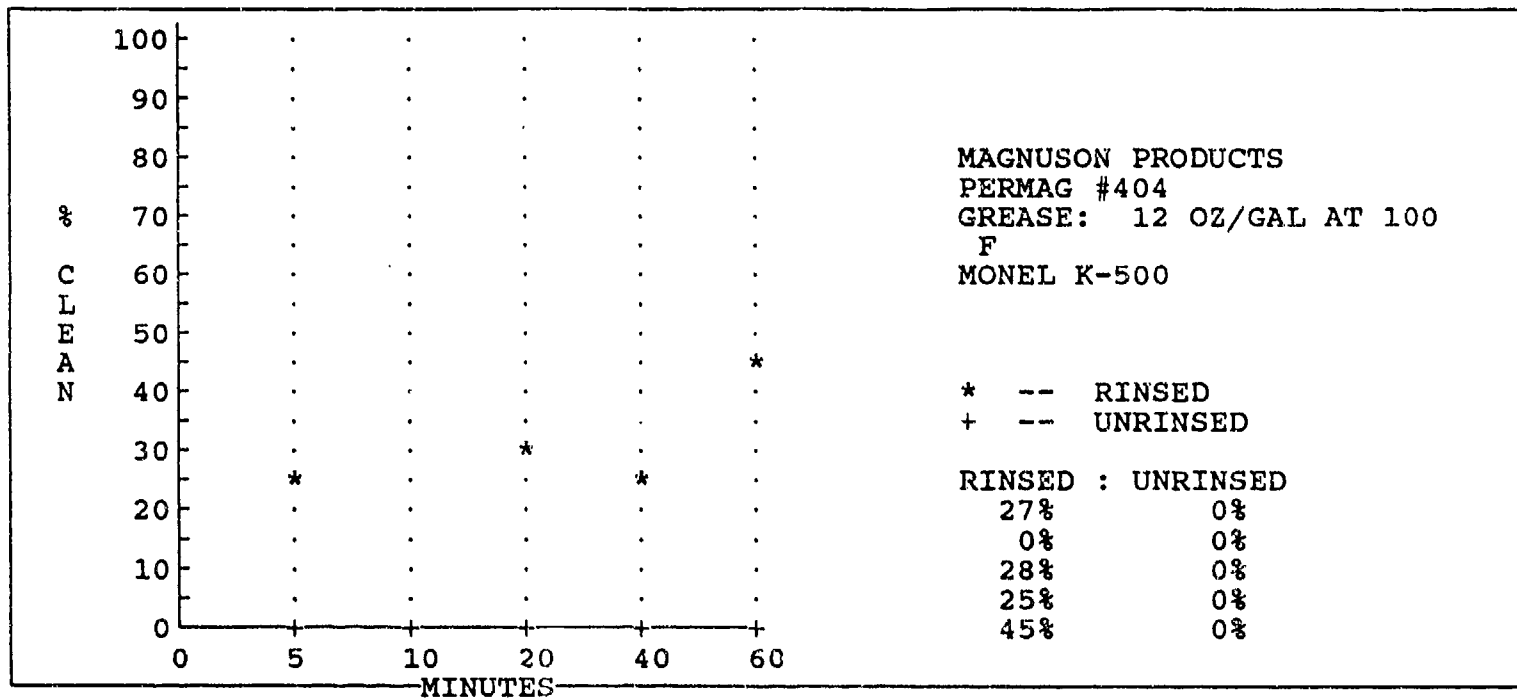
PHENOL	262*	*	.	.	.	.	.
10/11/88	249	.	.	.	.	.	.	0- 258
ATP ~ 79 E-8	236	.	*	.	.	.	.	1- 262
	223	.	.	.	.	.	.	2- 236
	210	.	.	.	.	.	.	3- 189
	197	.	.	.	.	.	.	4- 140
M-OIL-FREE CO.	183	.	.	*	.	.	.	5- -24
M-OIL-FREE #1000	170	.	.	.	.	.	.	6- 36
	157	.	.	.	.	.	.
M-OIL-FREE CO.	144	.	.	.	*	.	.	DRY
ULTRA 1	131	.	.	.	.	.	.	WEIGHT
	118	.	.	.	.	.	.	0.0554
PACIFIC CHEMICAL	105	.	.	.	.	.	.
FIST	92	.	.	.	.	.	.
	79	.	.	.	.	.	.
VAN STRAATEN CHEM CO.	66	.	.	.	.	.	.
3625	52	.	.	.	.	.	.
	39	.	.	.	.	.	*
	26	.	.	.	.	.	.
	13	.	.	.	.	.	.
	0	.	.	.	.	.	.

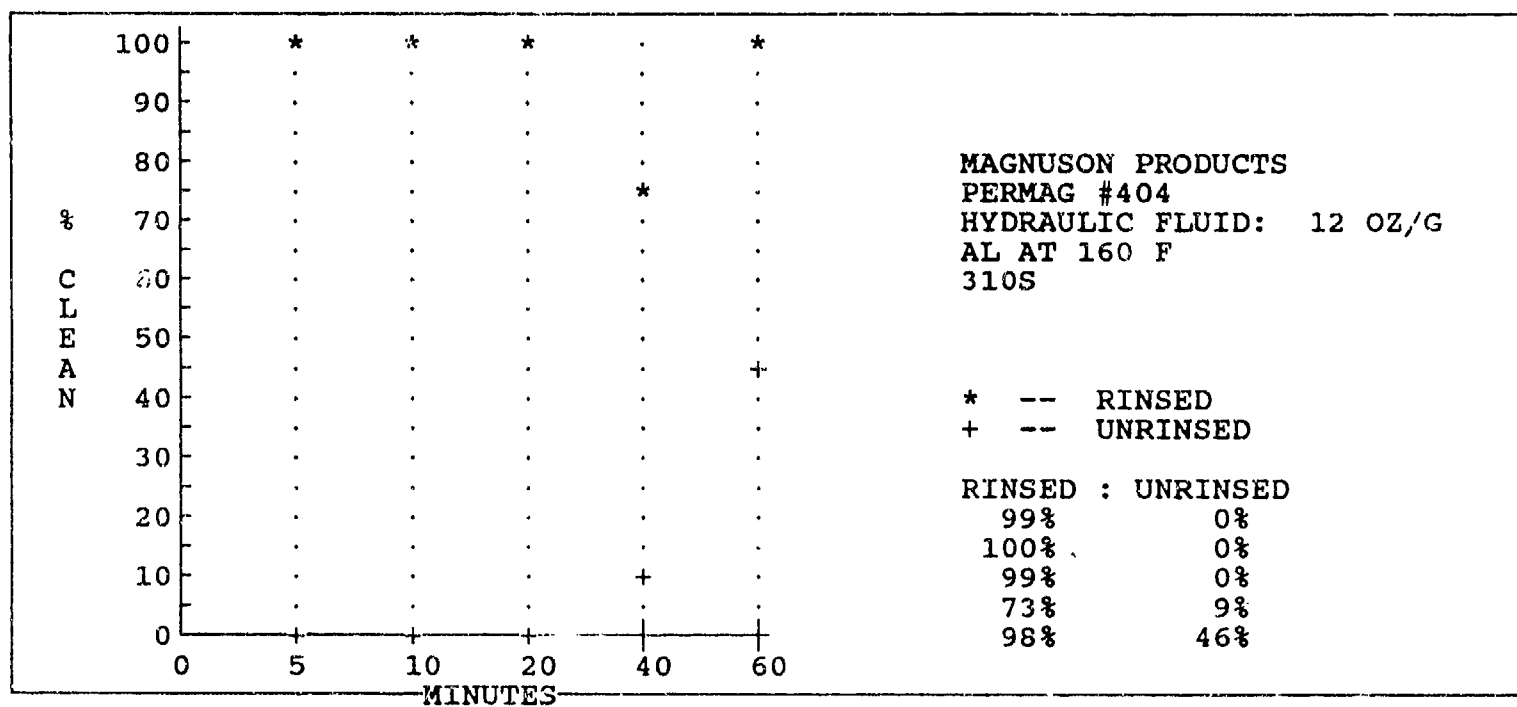
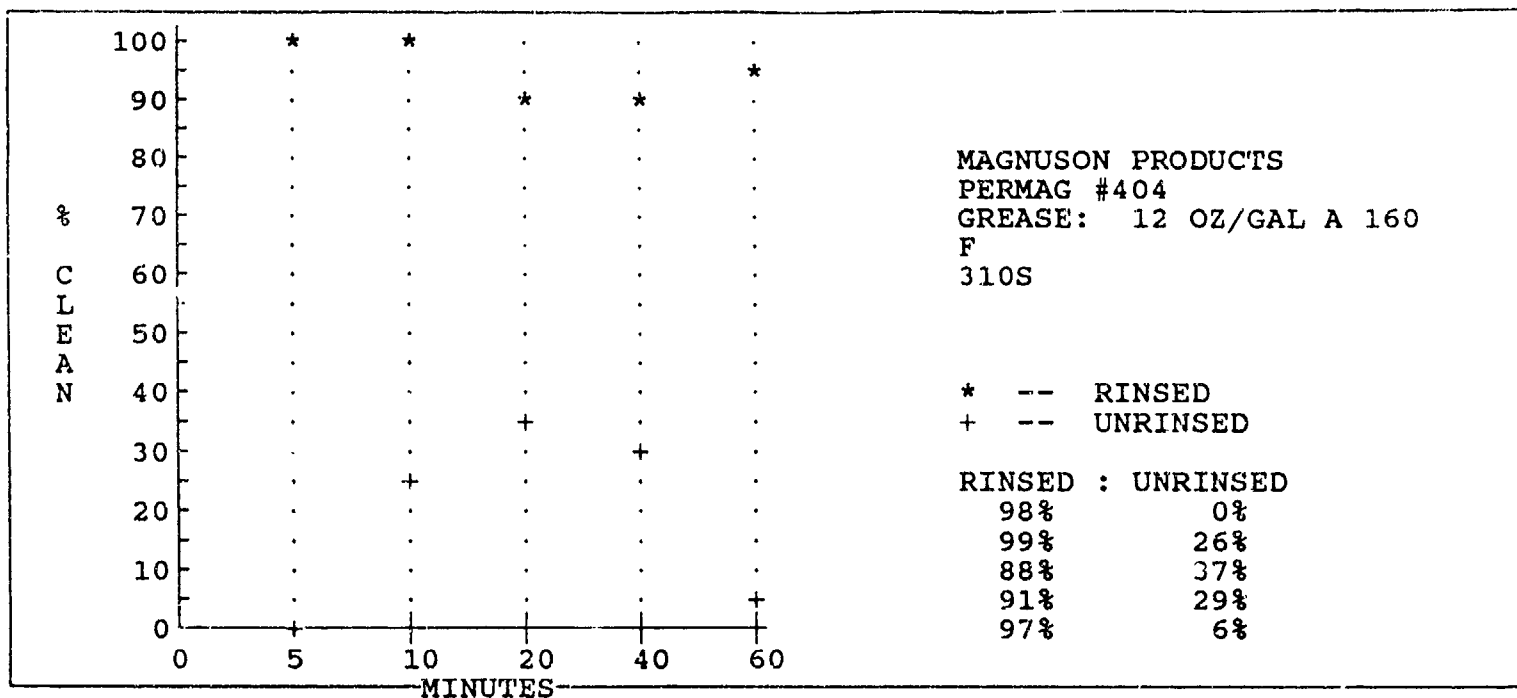
DATE - 10/11/88 COD vs TIME 0 1 2 3 4 5 6

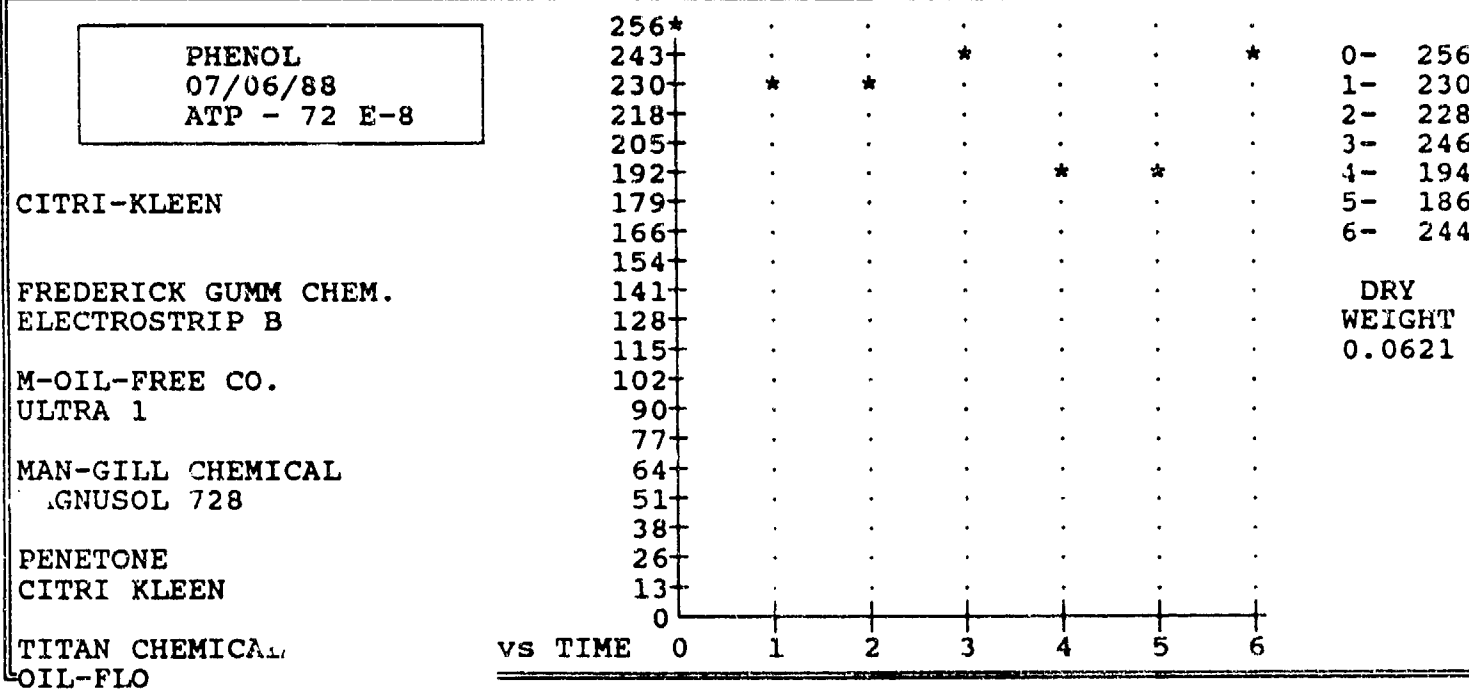
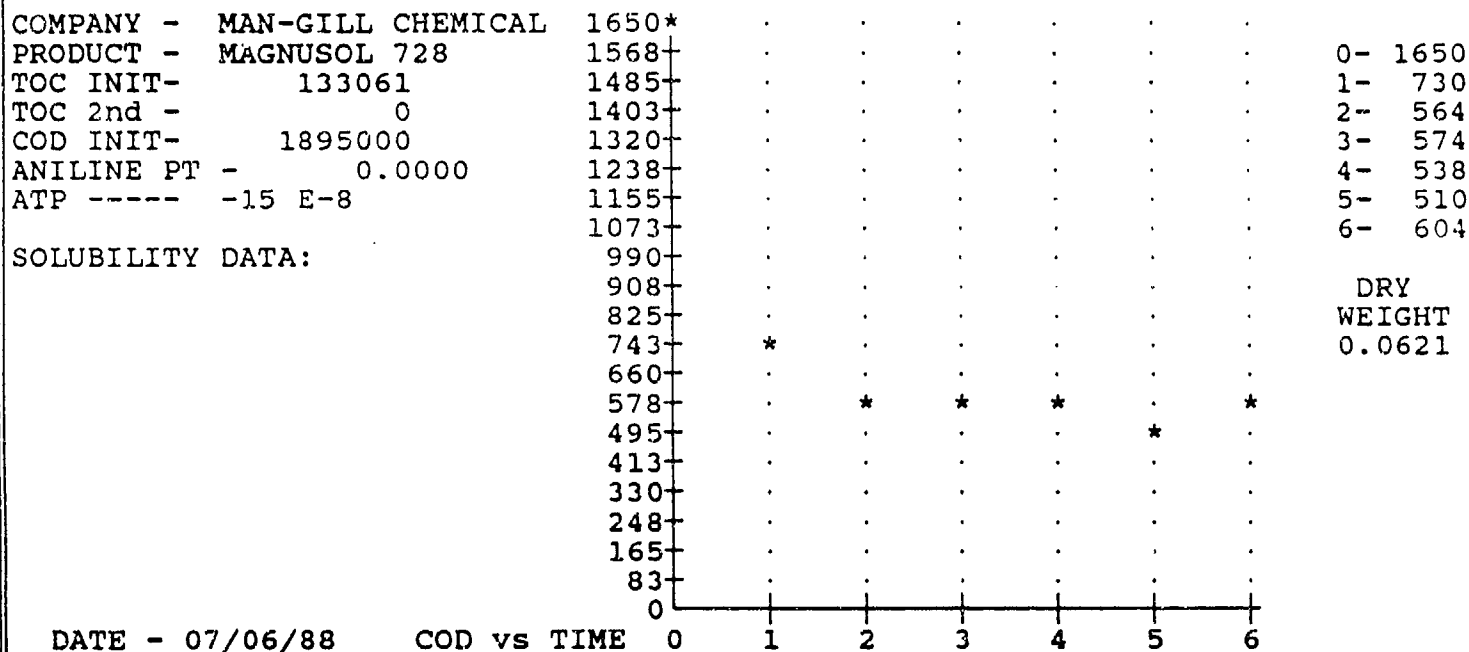


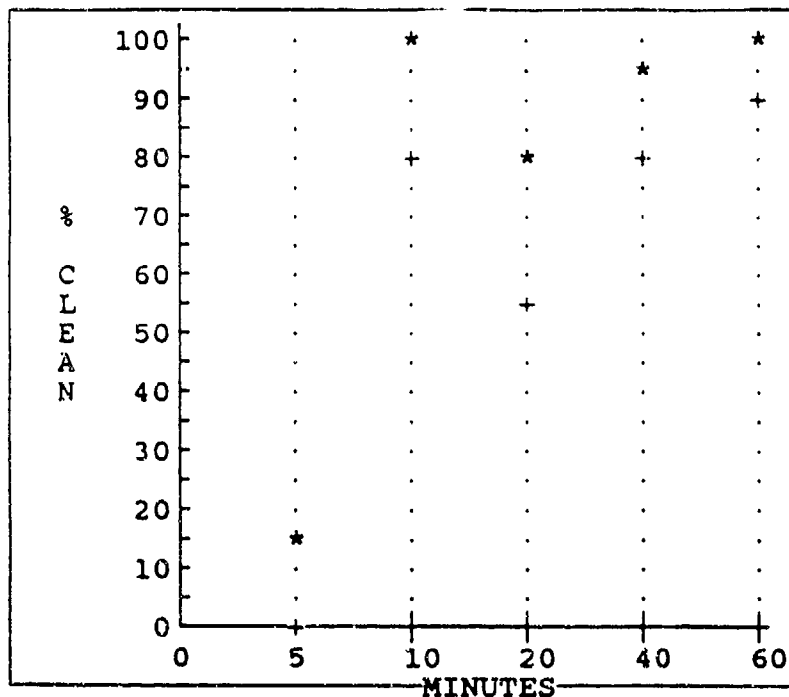




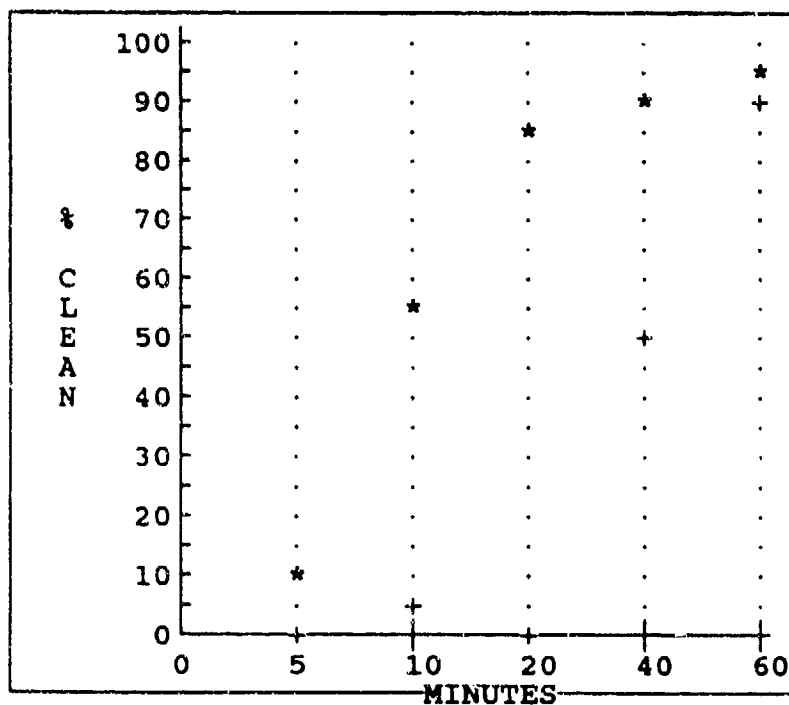




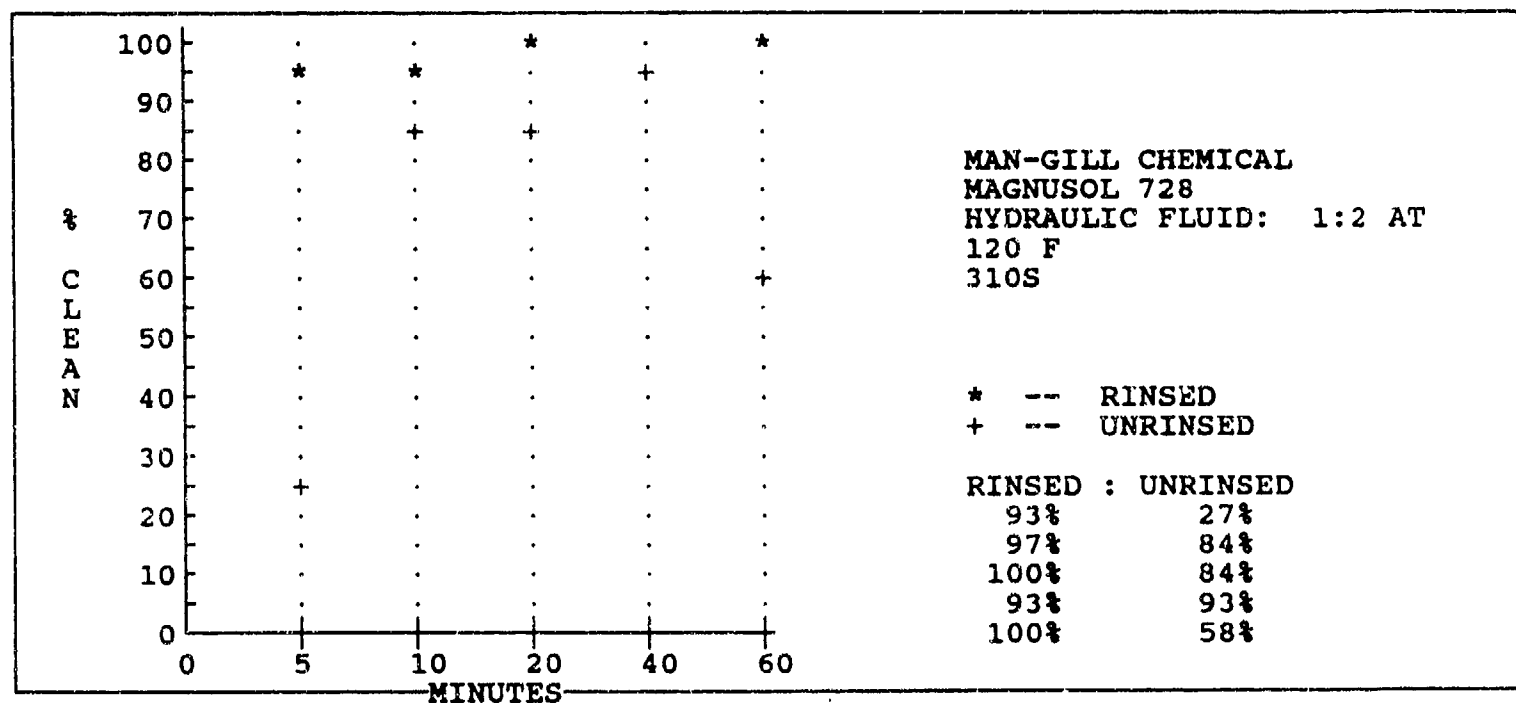
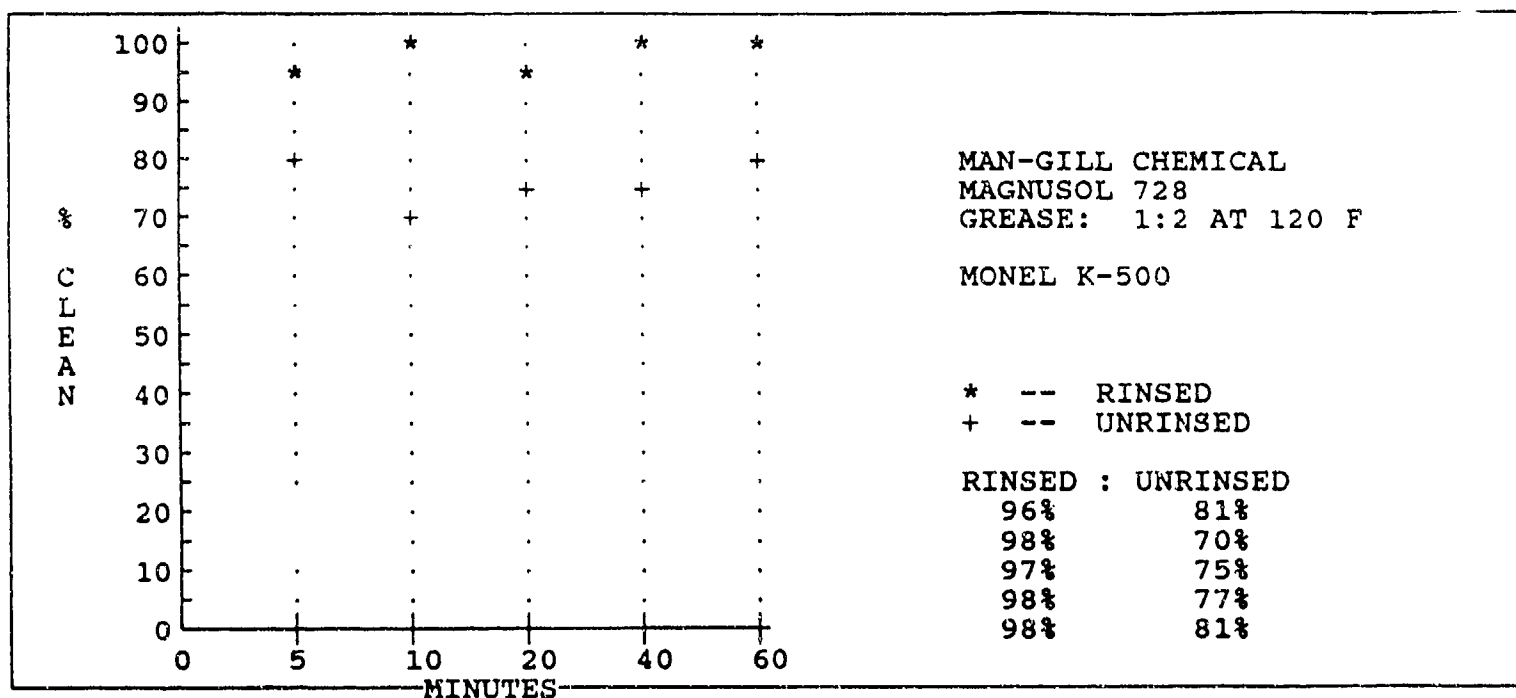


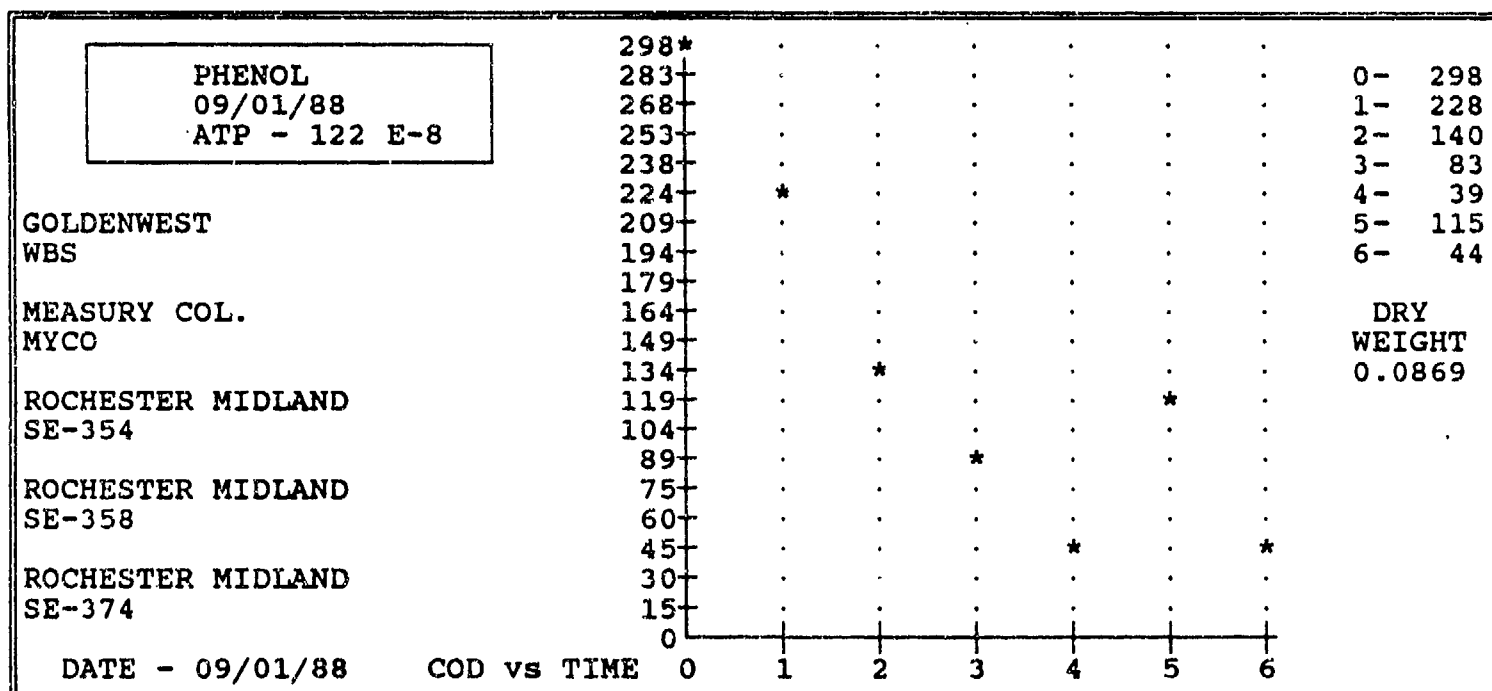
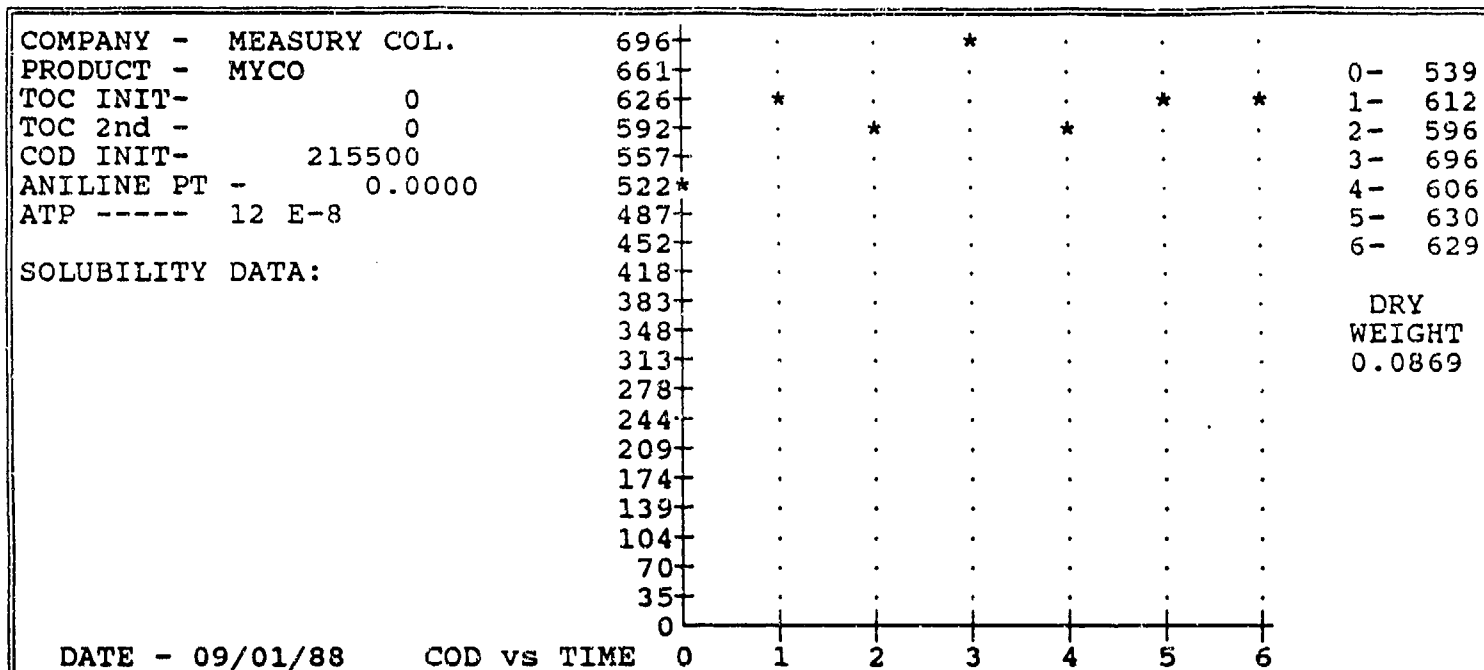


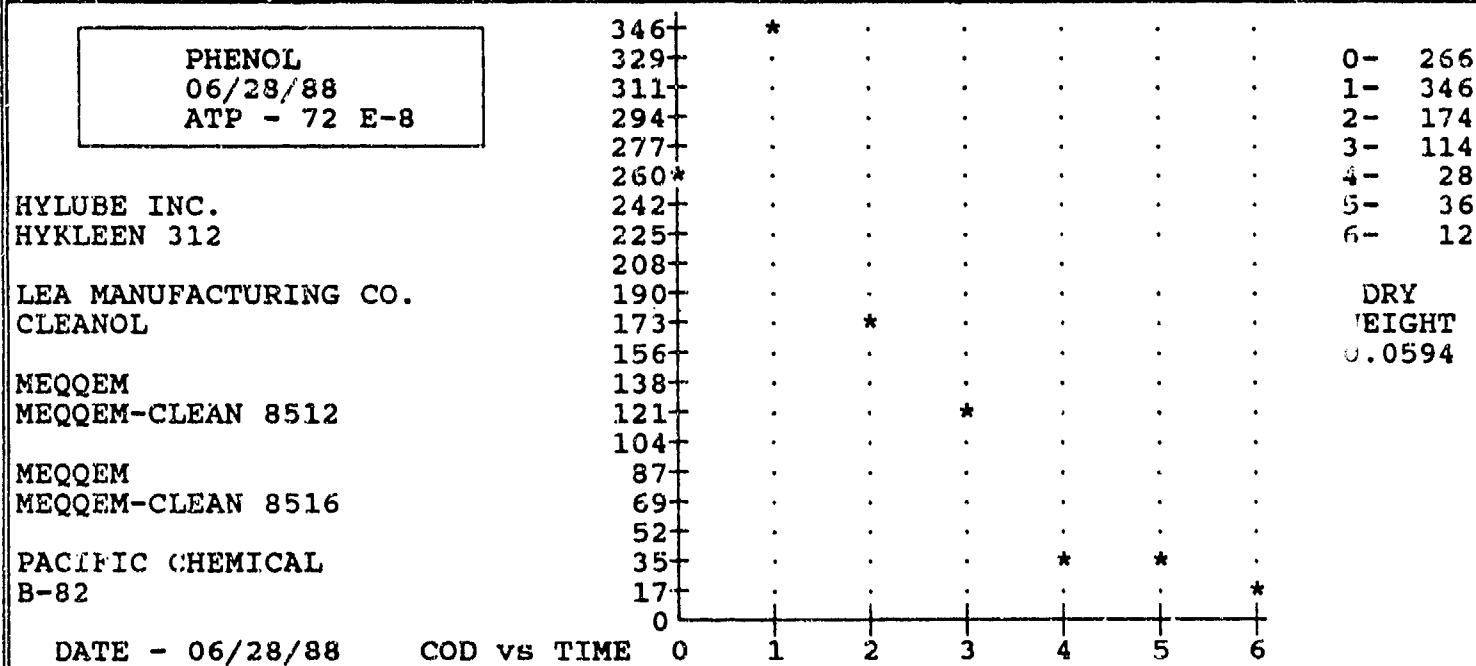
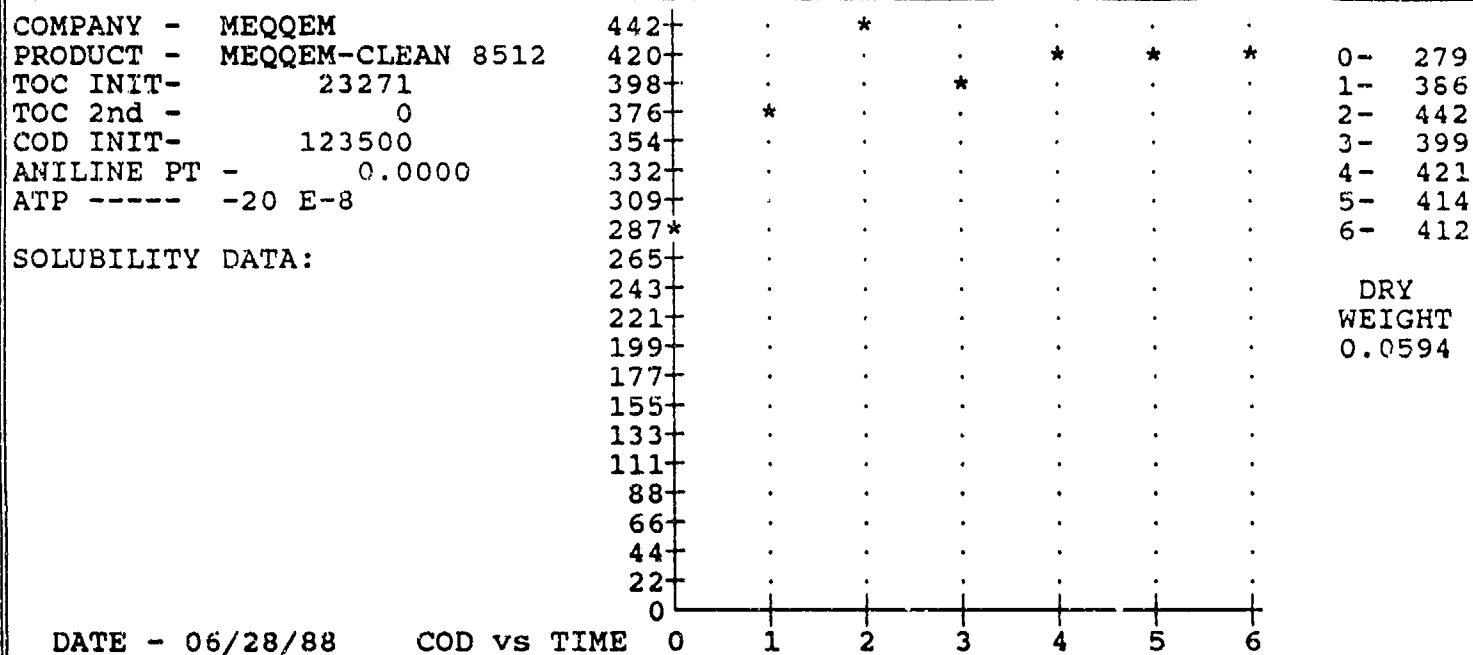
RINSED	UNRINSED
15%	0%
100%	78%
81%	56%
96%	81%
100%	88%

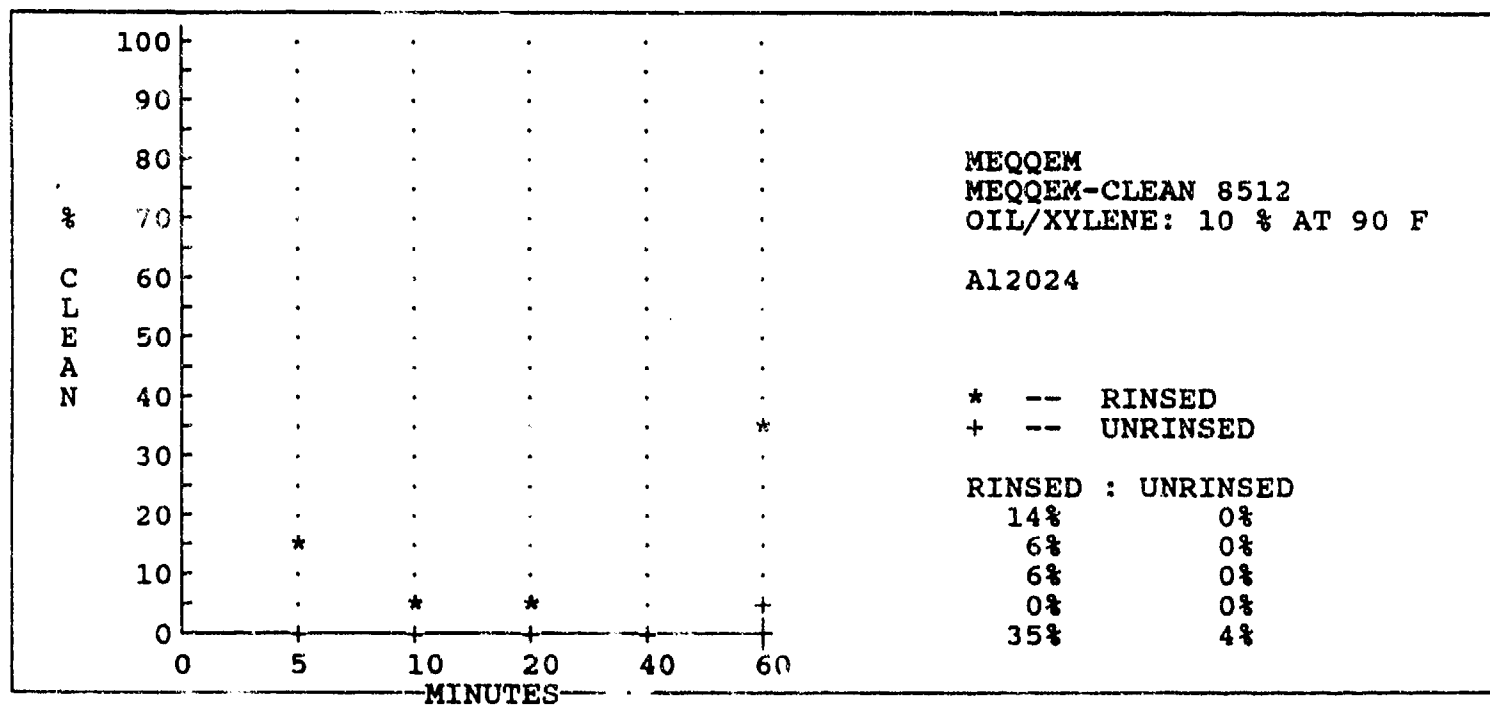
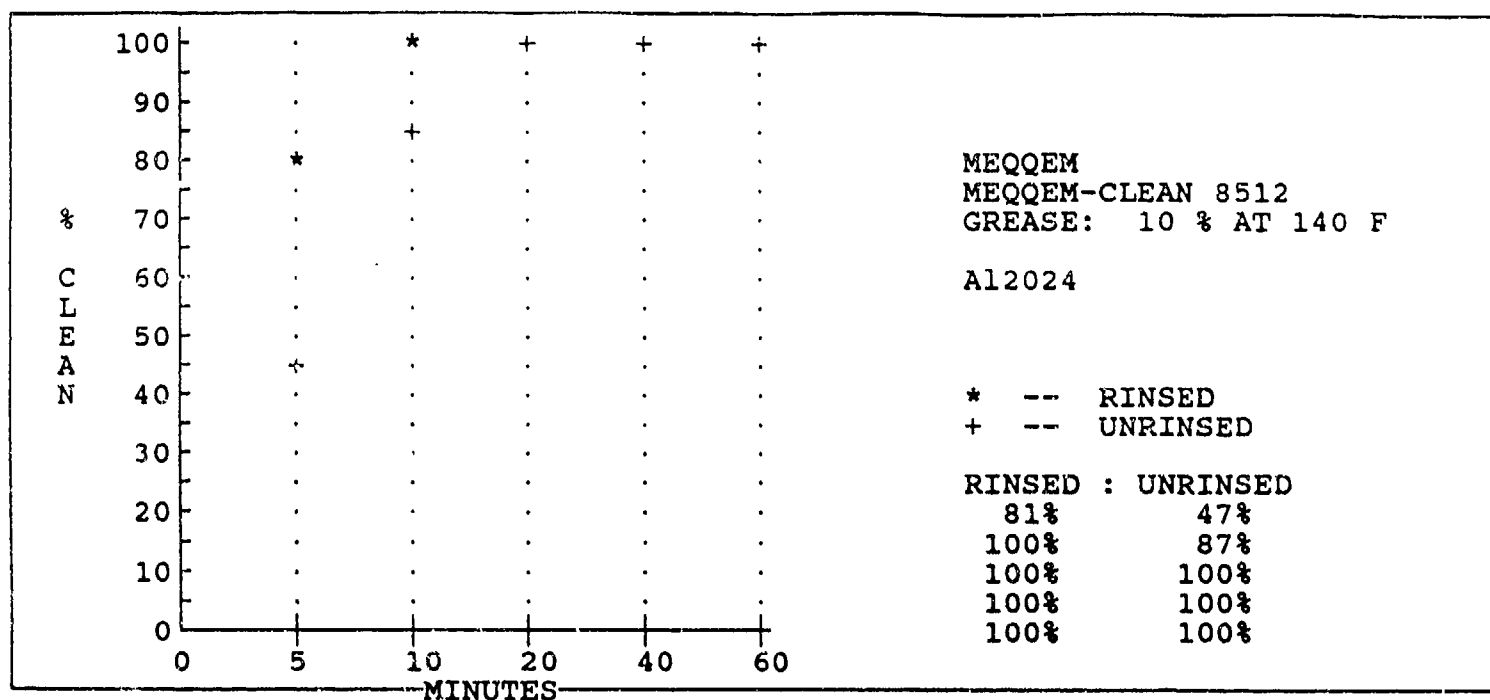


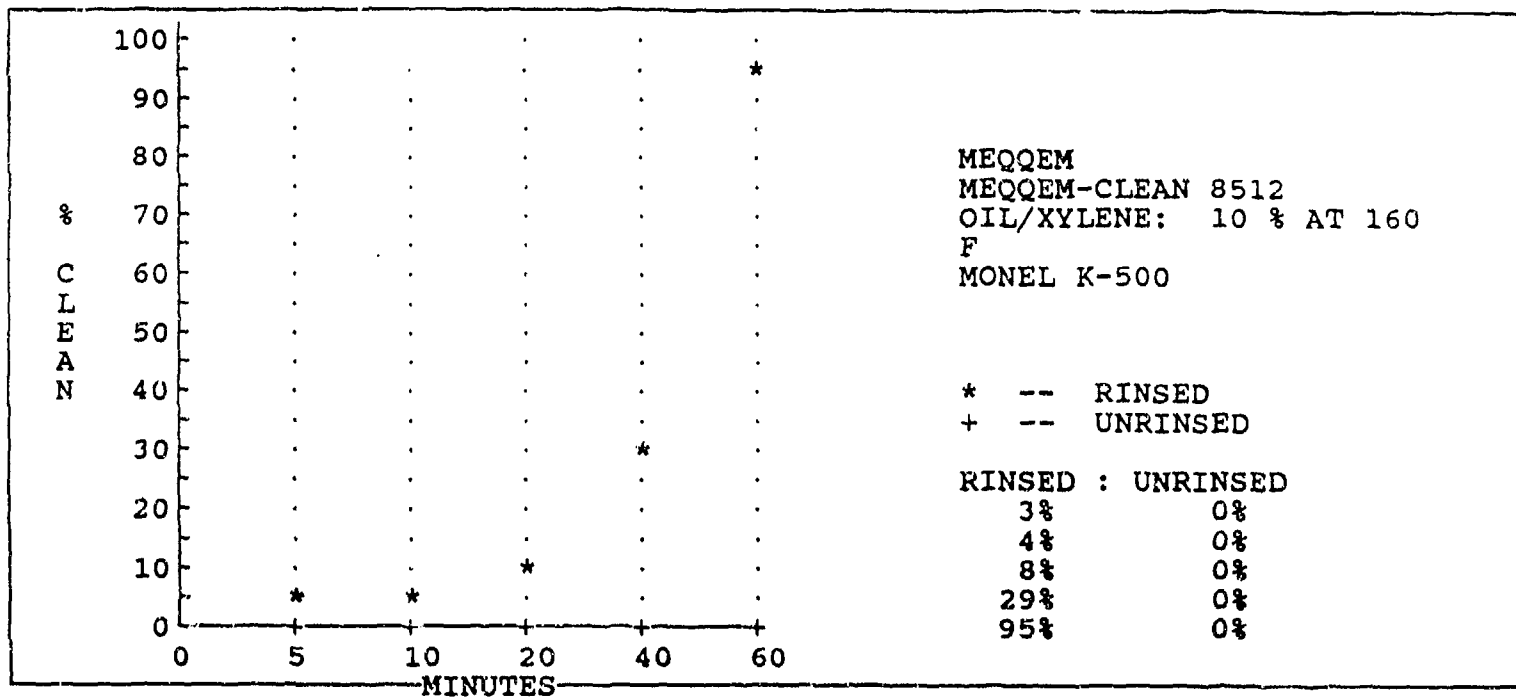
RINSED	UNRINSED
8%	0%
57%	3%
87%	0%
92%	52%
96%	89%

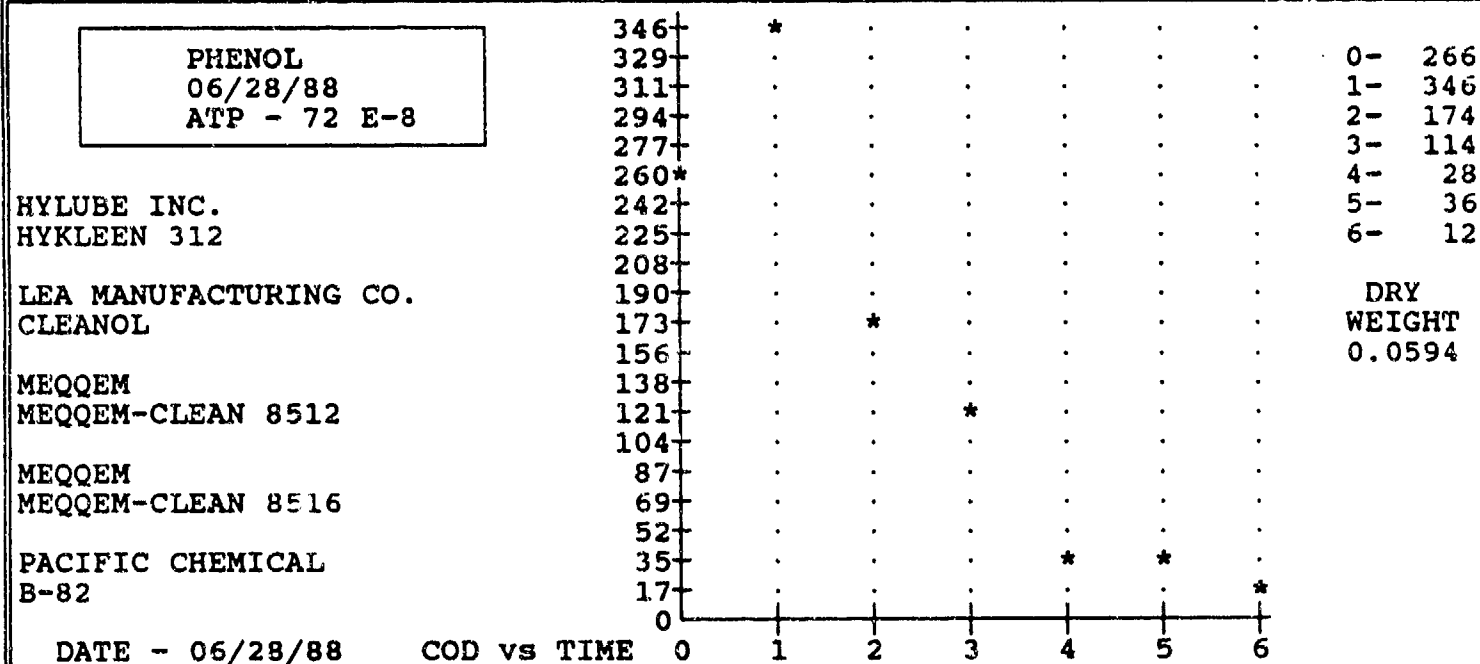
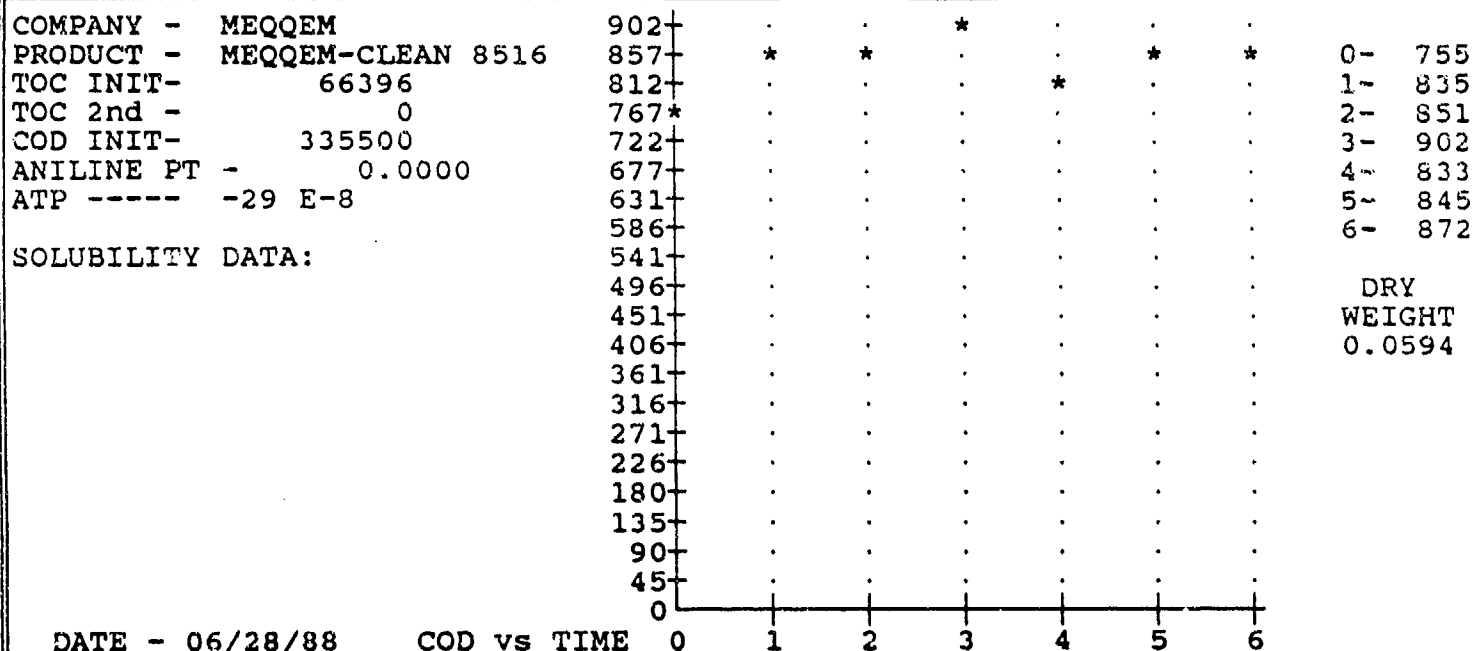


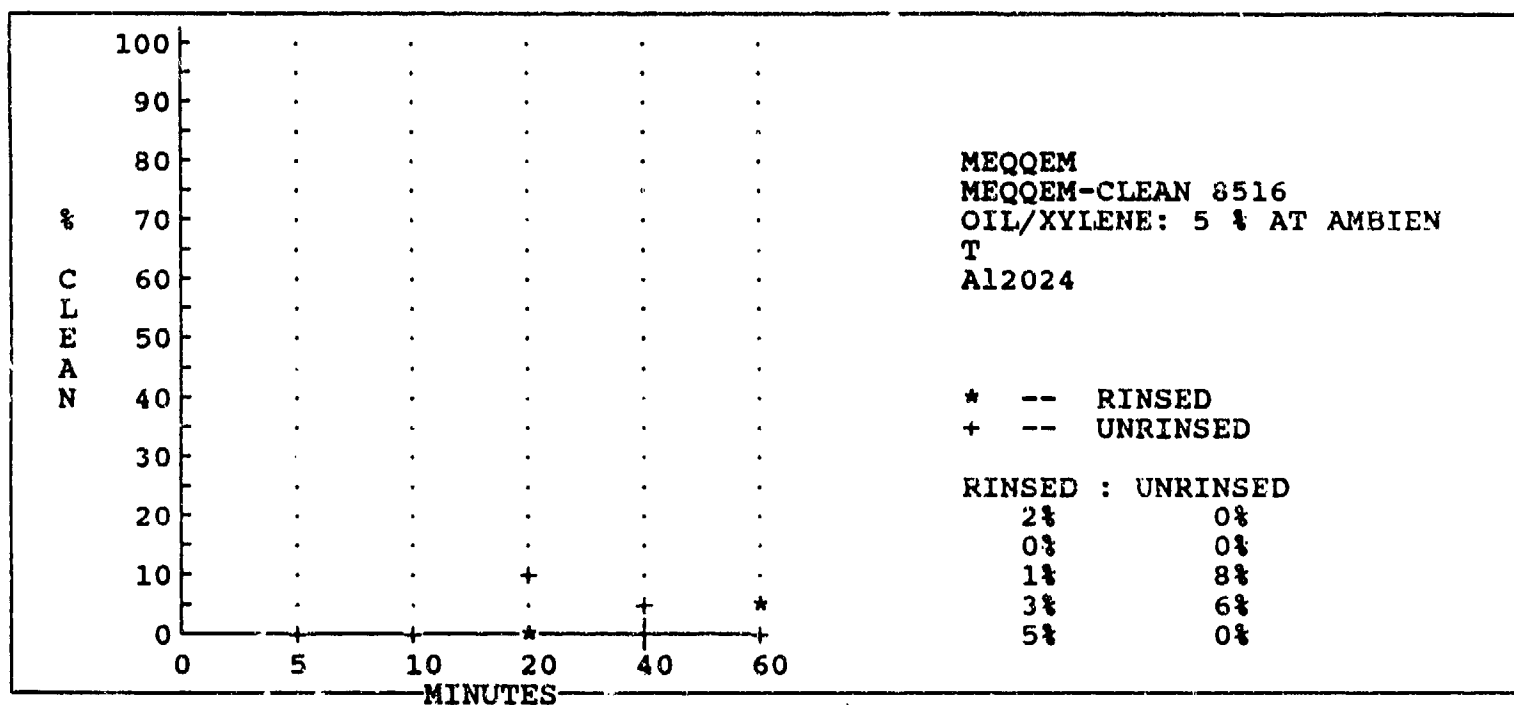
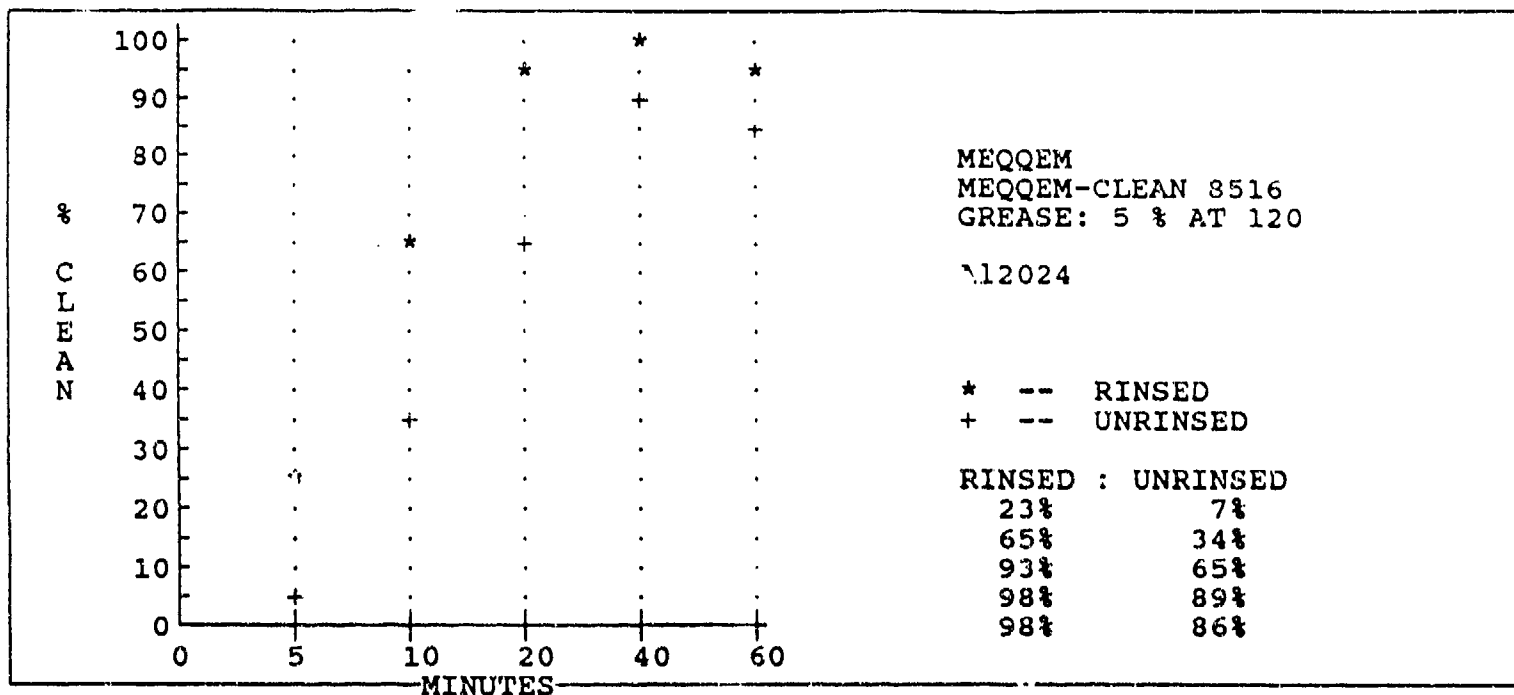


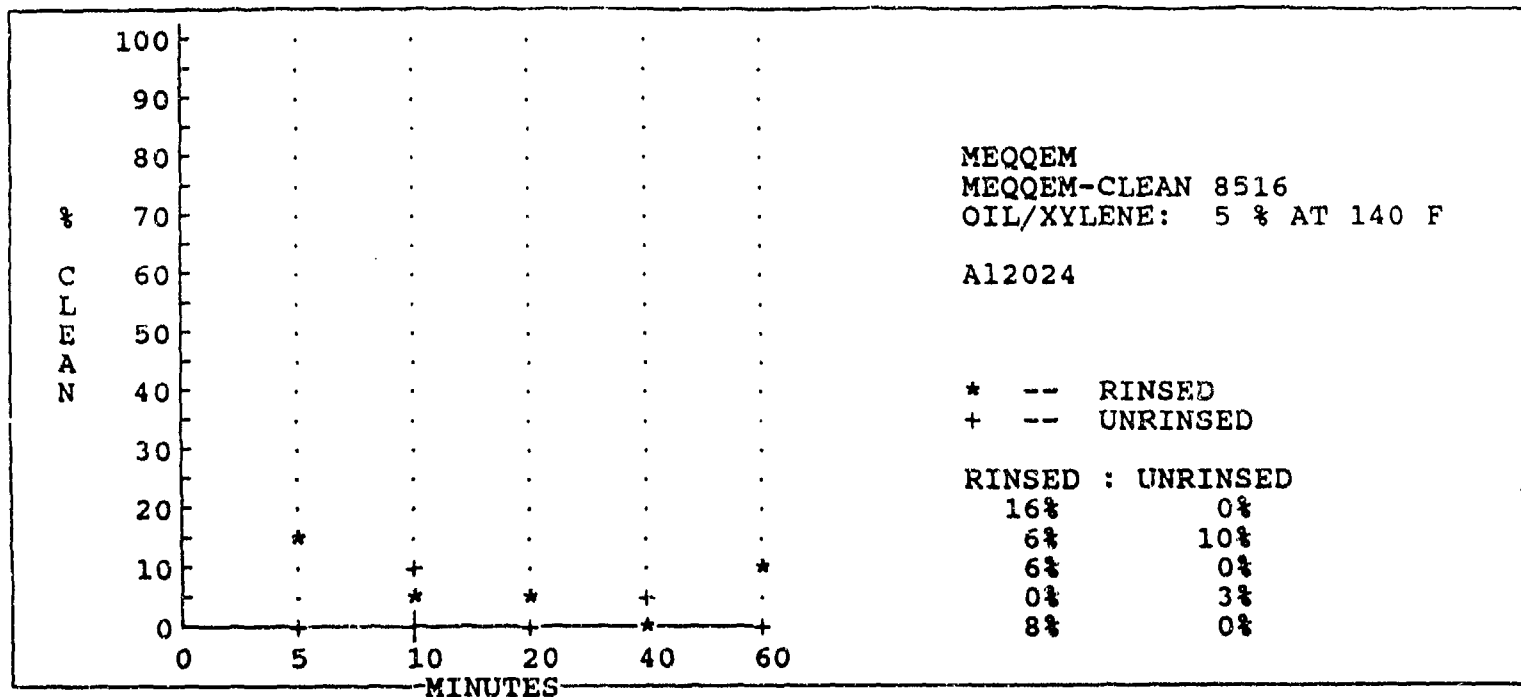


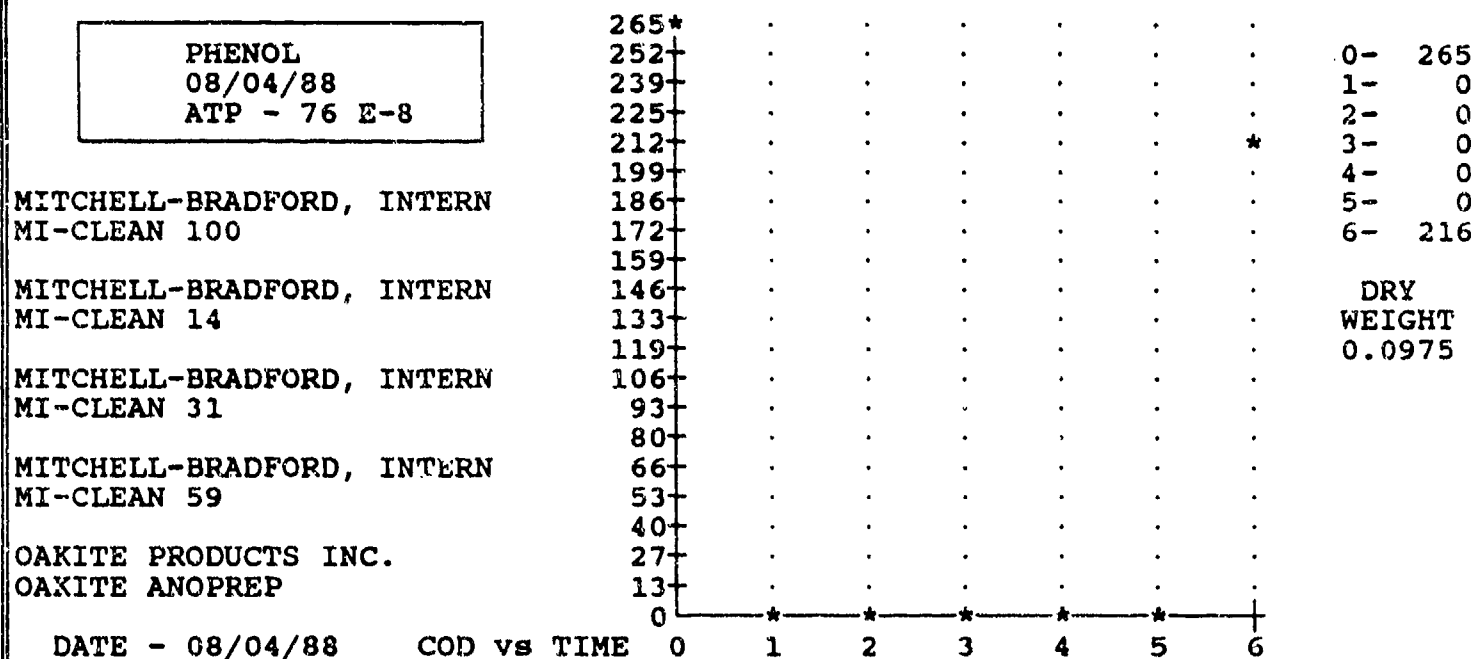
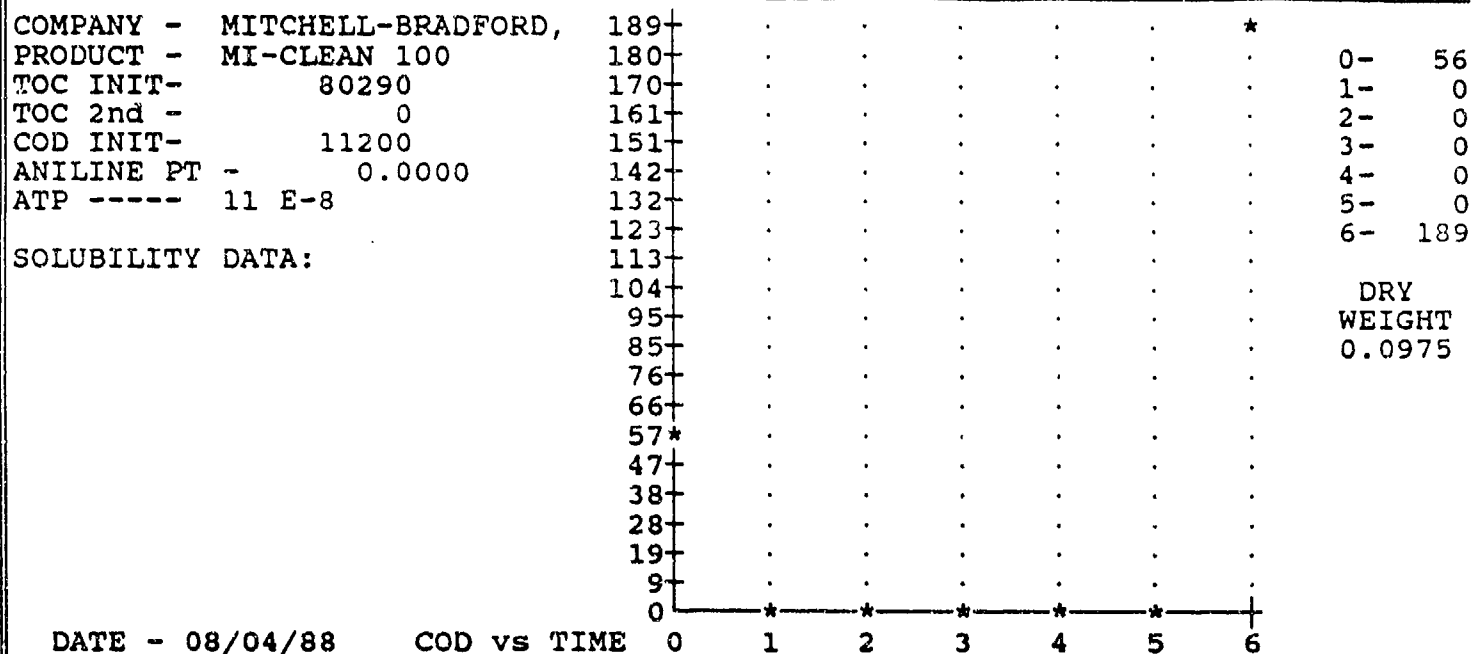


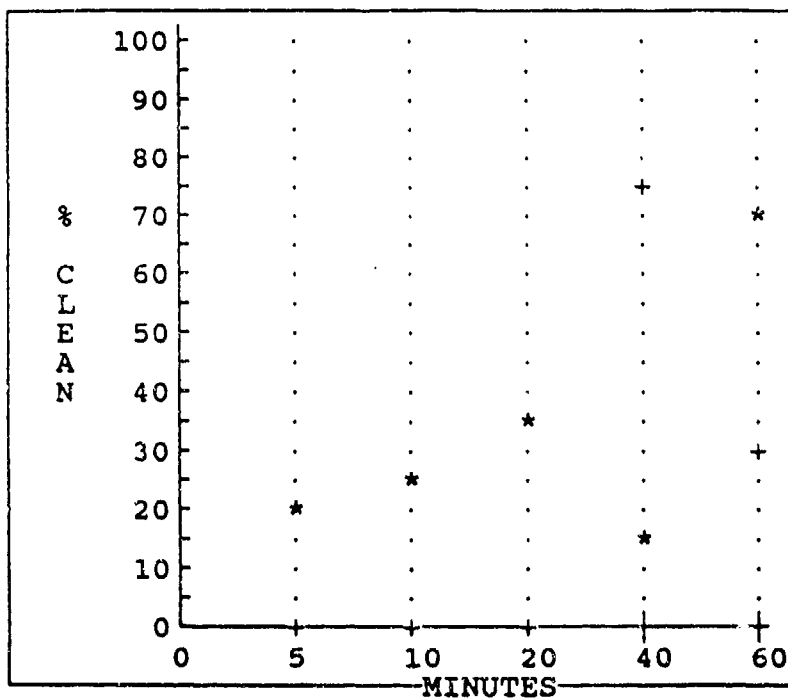








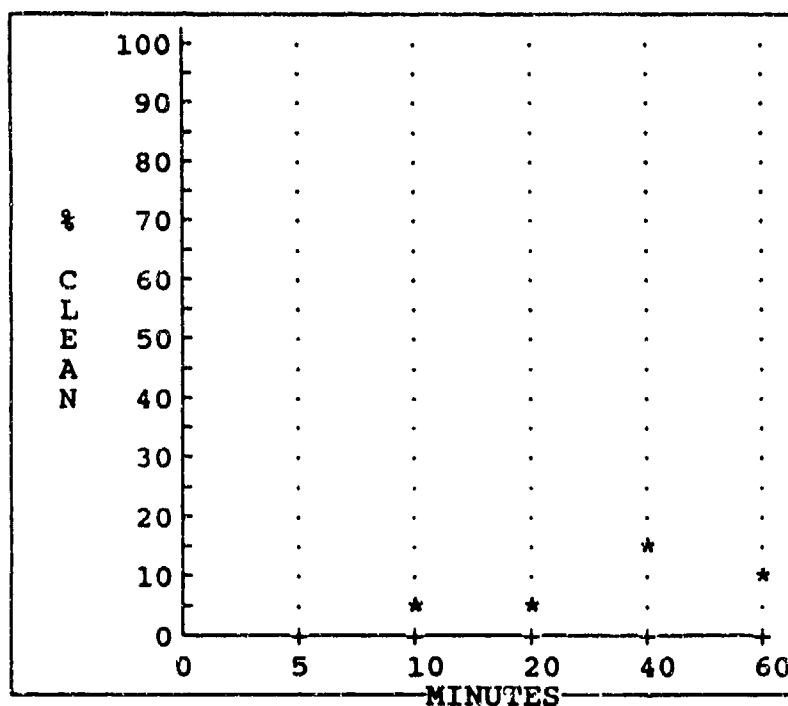




MITCHELL-BRADFORD, INTERN
MI-CLEAN 100
GREASE: 10 OZ/GAL 100 F
MONEL K-500

* -- RINSED
+ -- UNRINSED

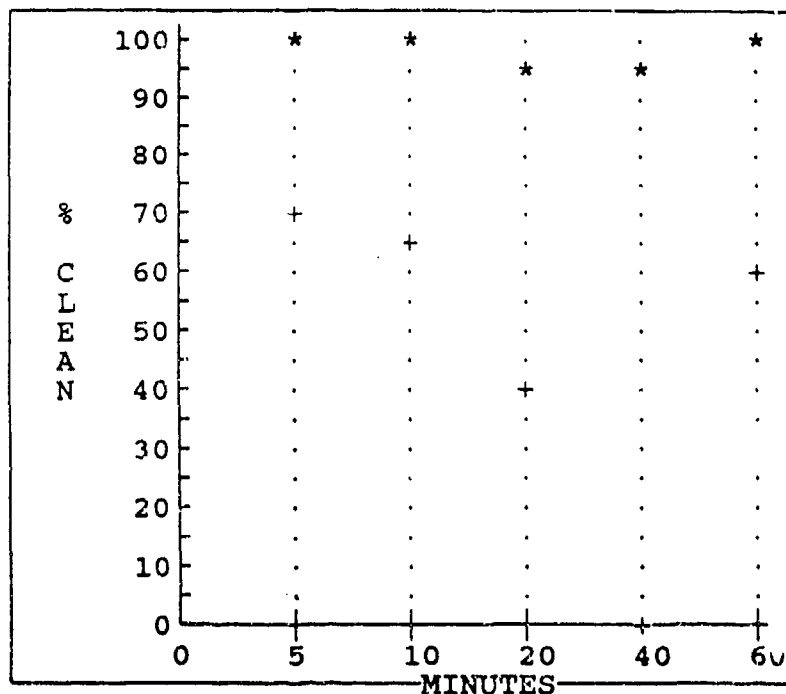
RINSED : UNRINSED
19% : 0%
24% : 0%
35% : 0%
13% : 75%
68% : 31%



MITCHELL-BRADFORD, INTERN
MI-CLEAN 100
OIL & XYLENE: 10 OZ/GAL A
T 160 F
Az31B

* -- RINSED
+ -- UNRINSED

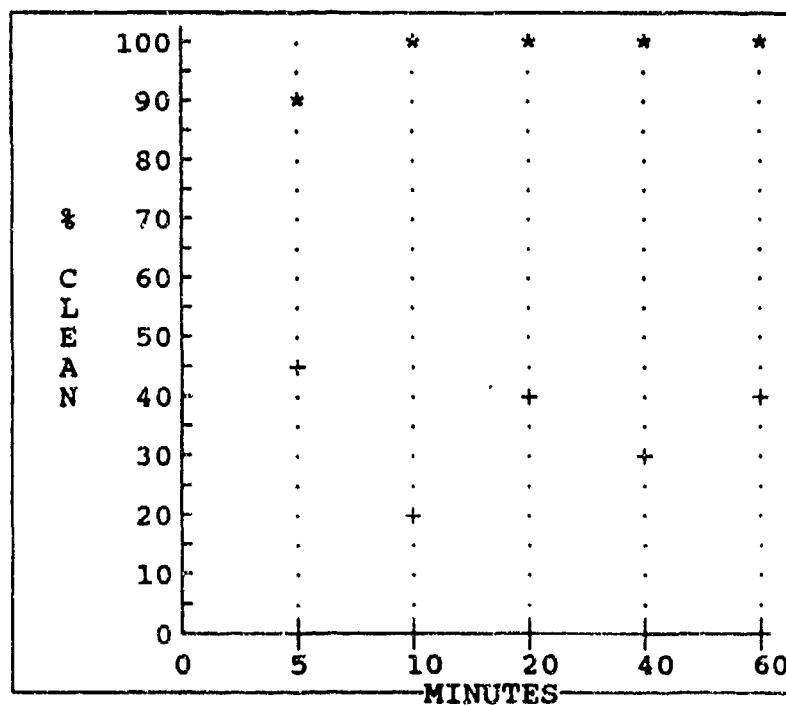
RINSED : UNRINSED
0% : 0%
7% : 0%
7% : 0%
15% : 0%
12% : 0%



MITCHELL-BRADFORD, INTERN
MI-CLEAN 100
GREASE: 10 OZ/GAL AT 160
F
INCONEL 750

* -- RINSED
+ -- UNRINSED

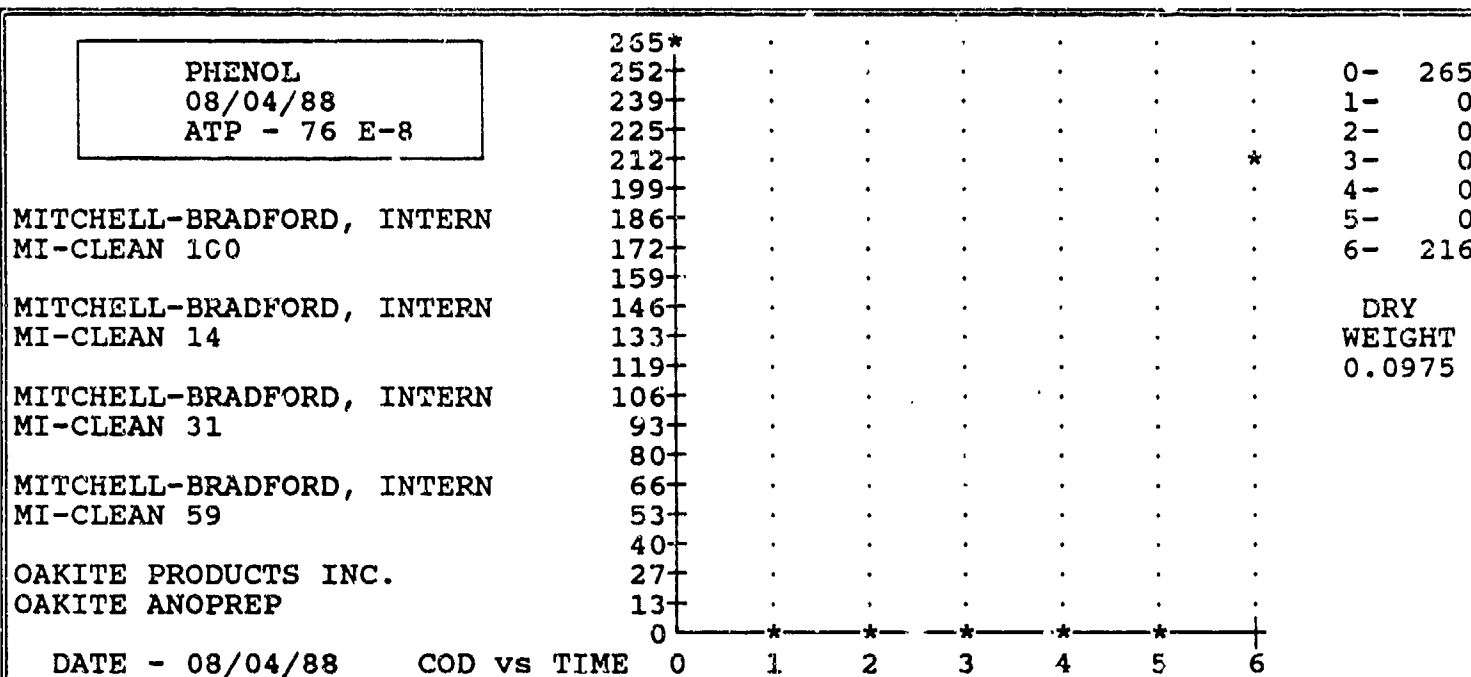
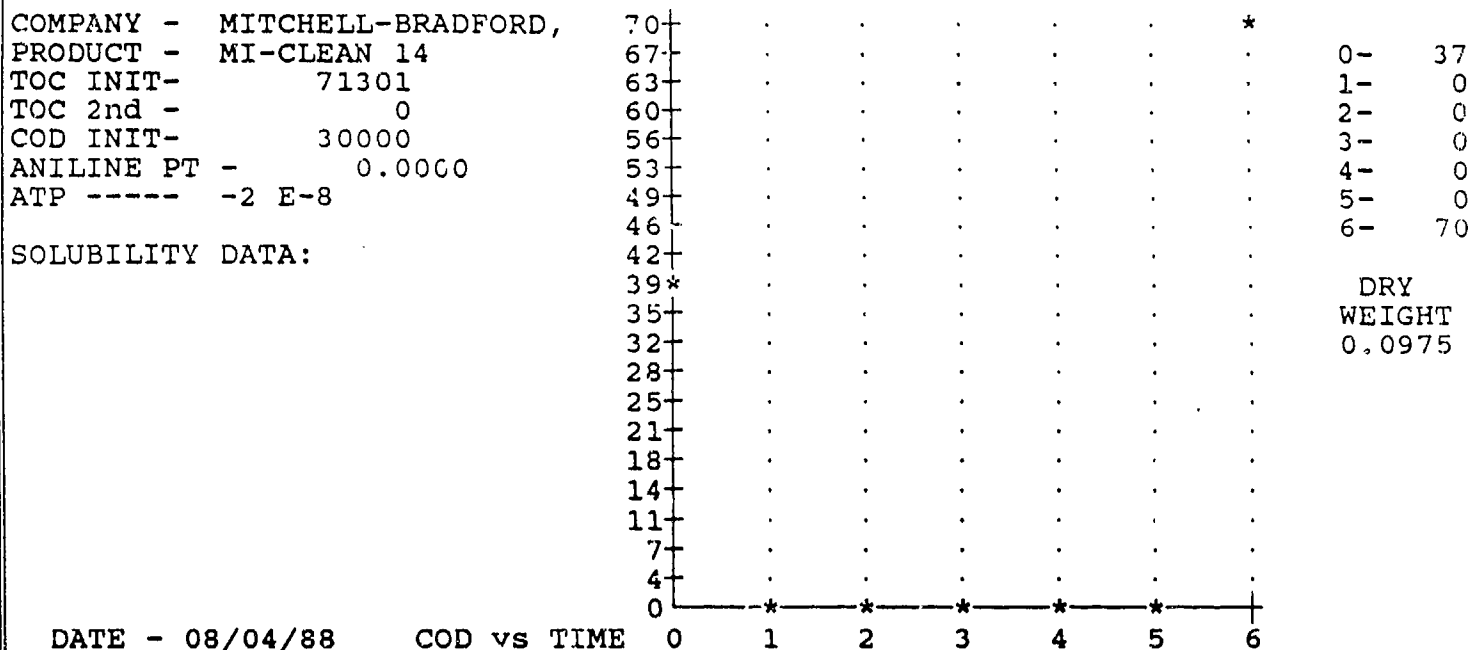
RINSED :	UNRINSED
100%	69%
100%	67%
97%	39%
95%	0%
100%	62%

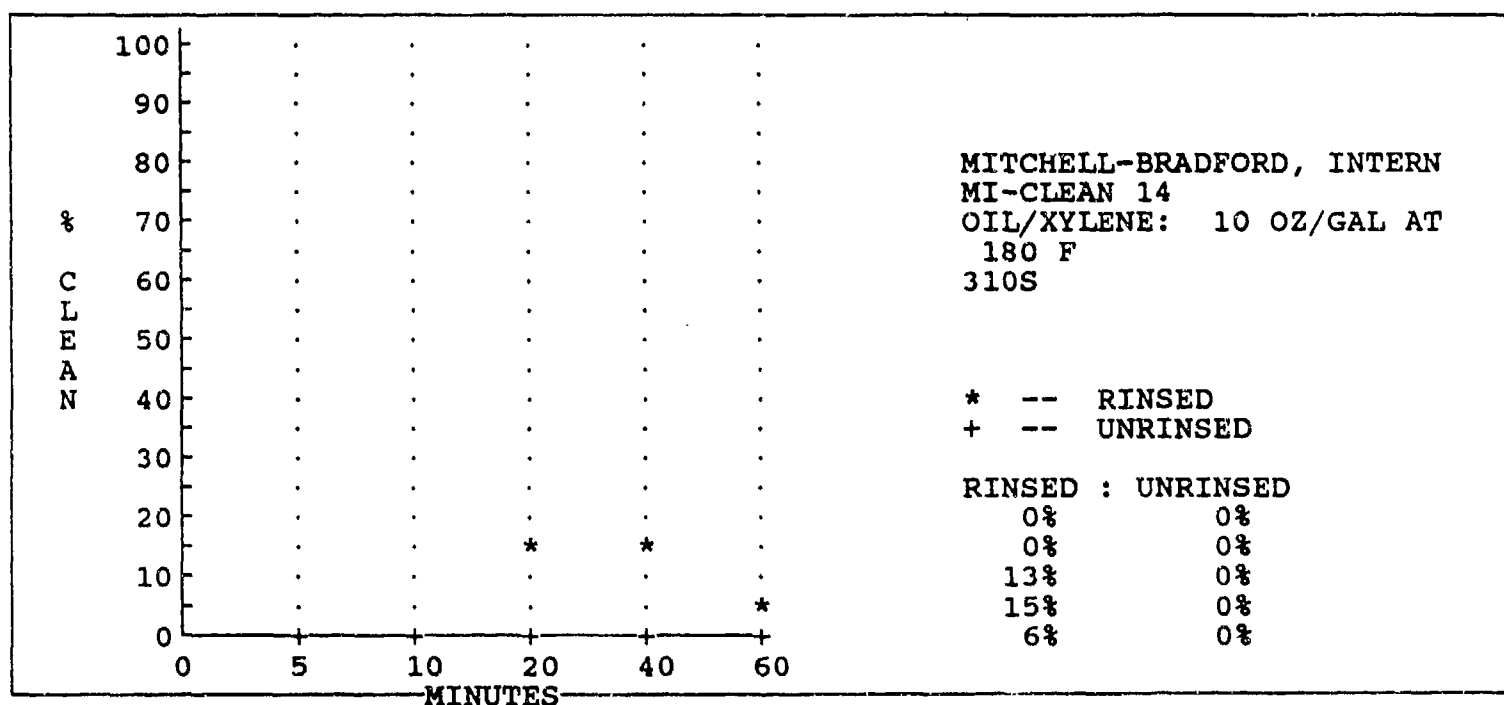
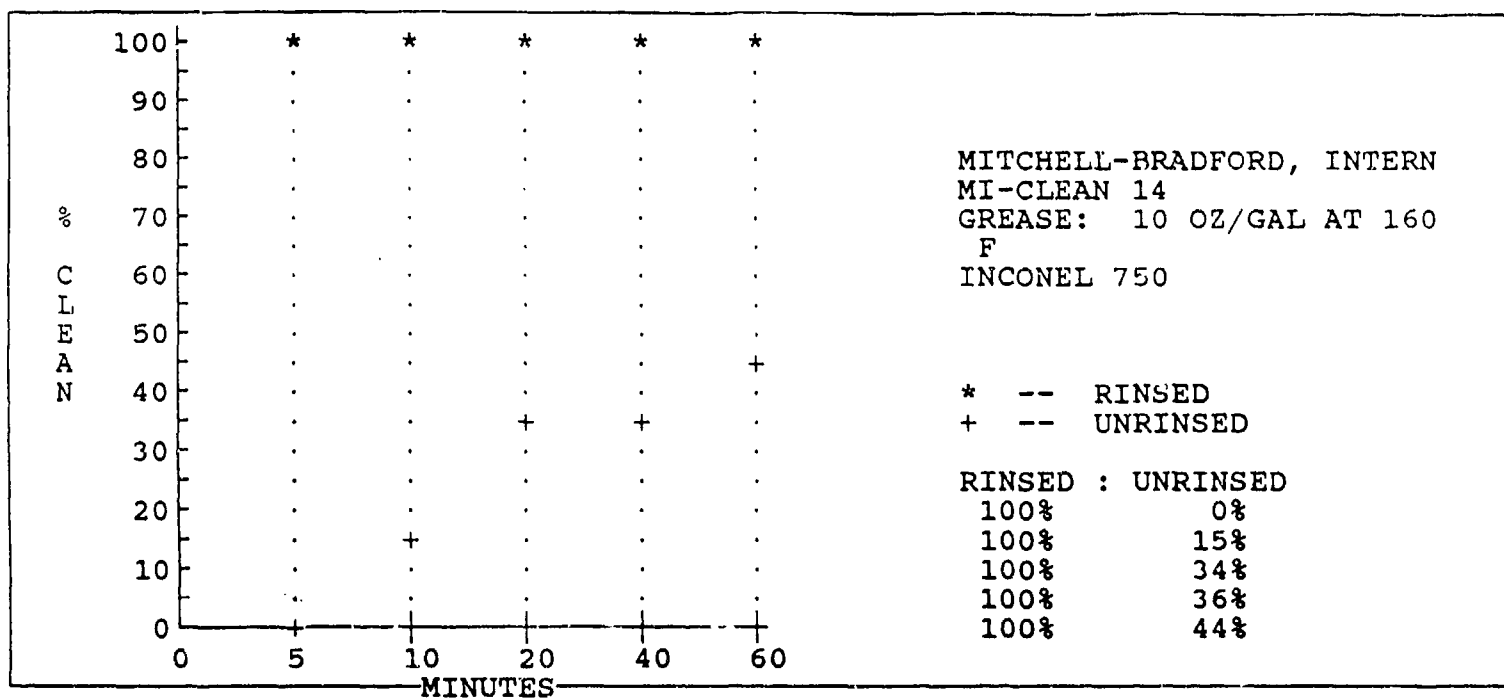


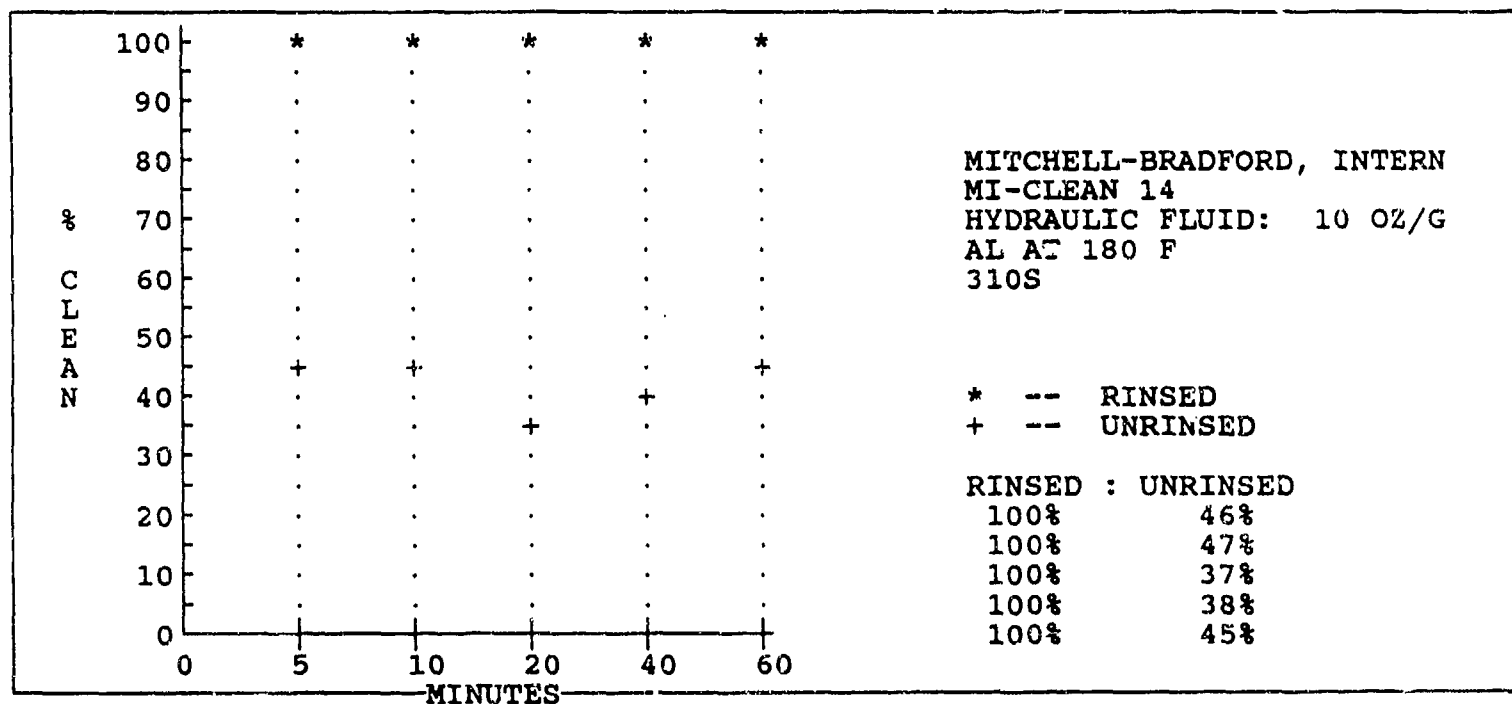
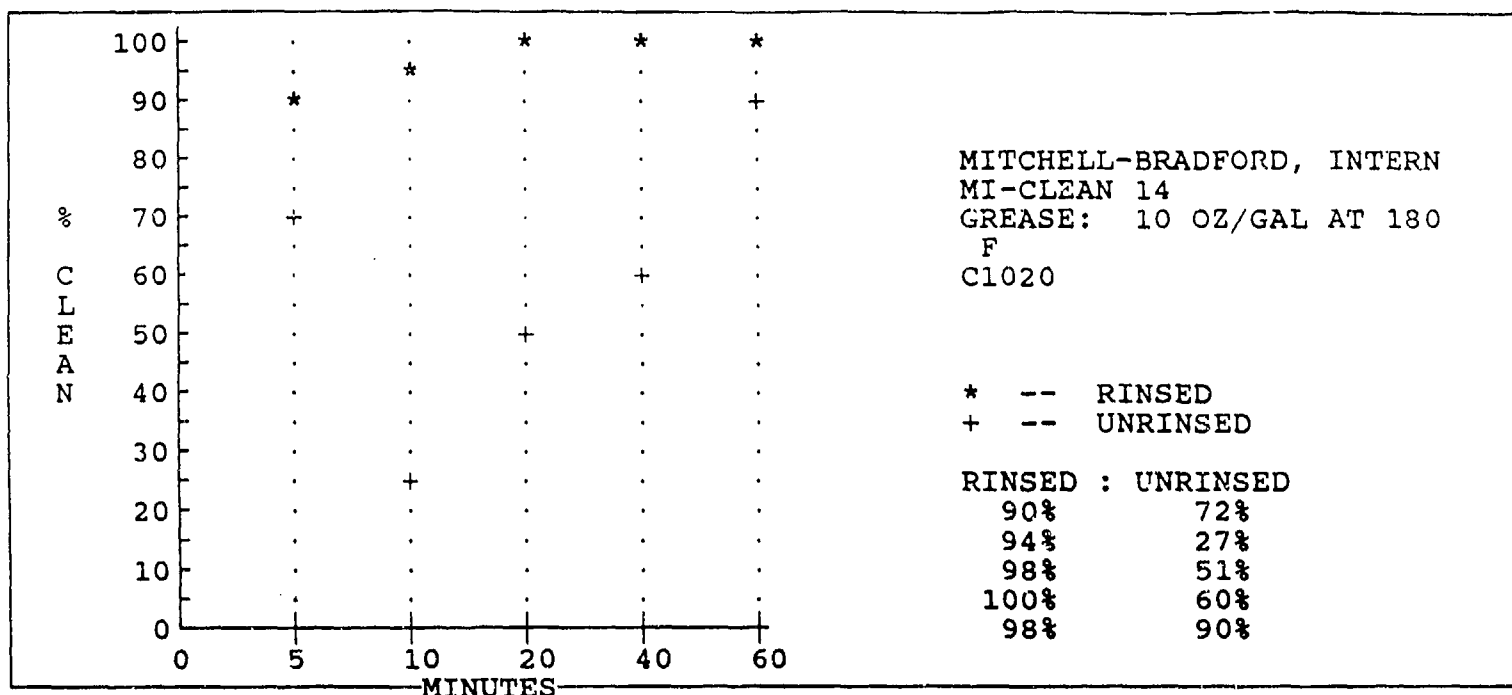
MITCHELL-BRADFORD, INTERN
MI-CLEAN 100
HYDRAULIC FLUID: 10 OZ/G
AL AT 160 F
INCONEL 750

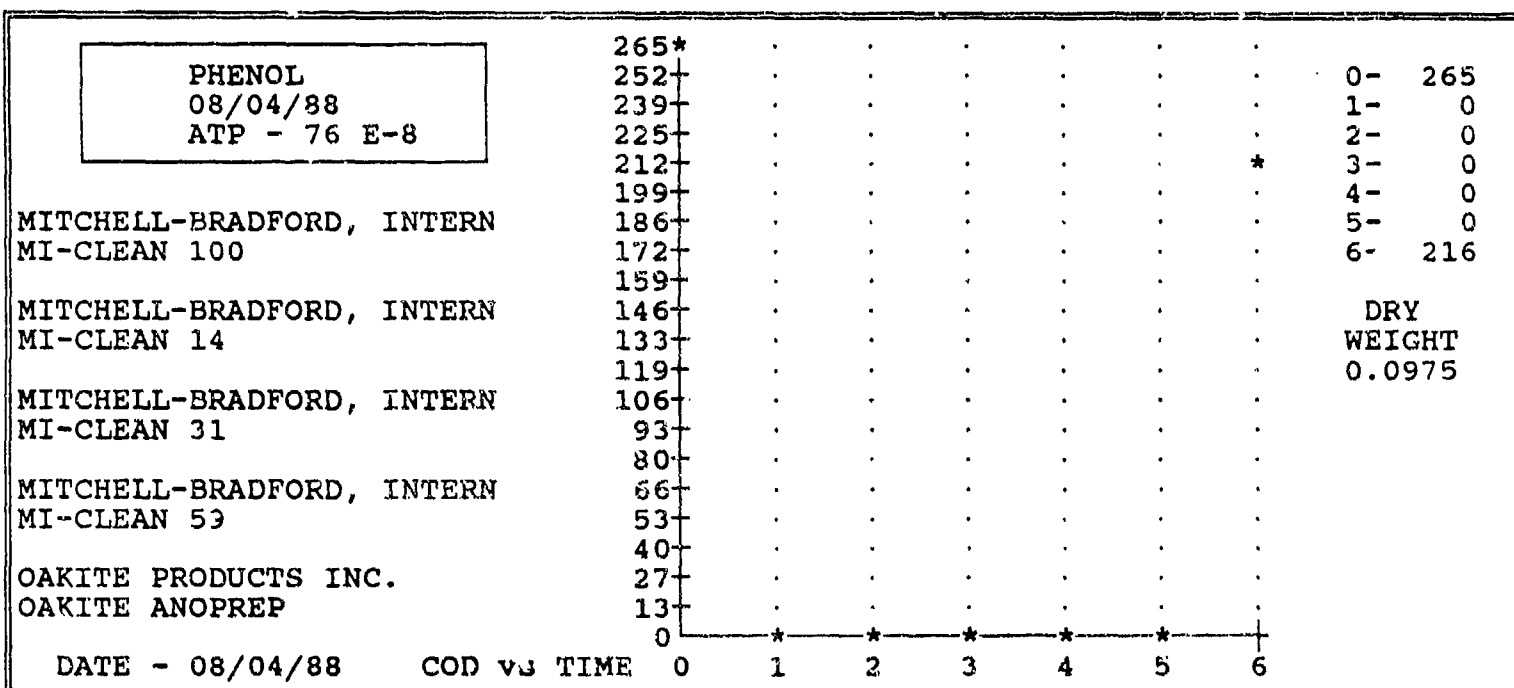
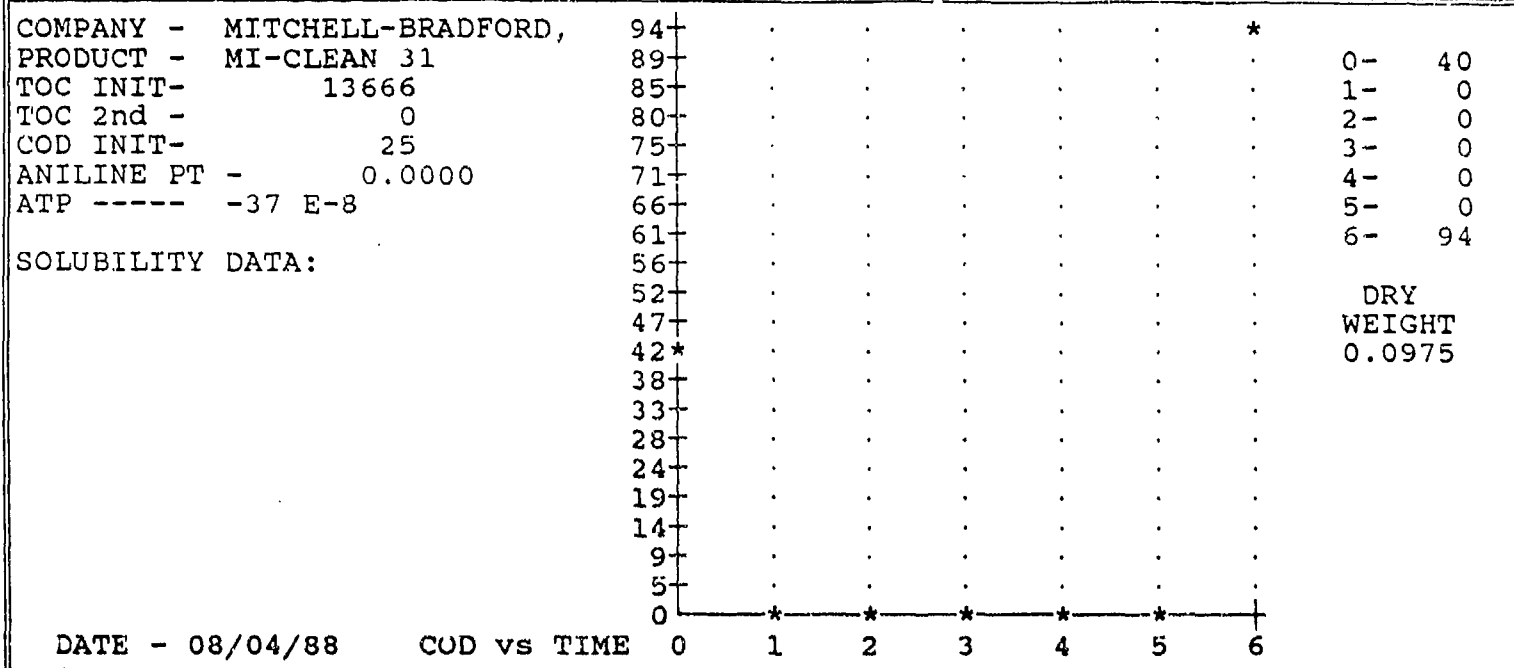
* -- RINSED
+ -- UNRINSED

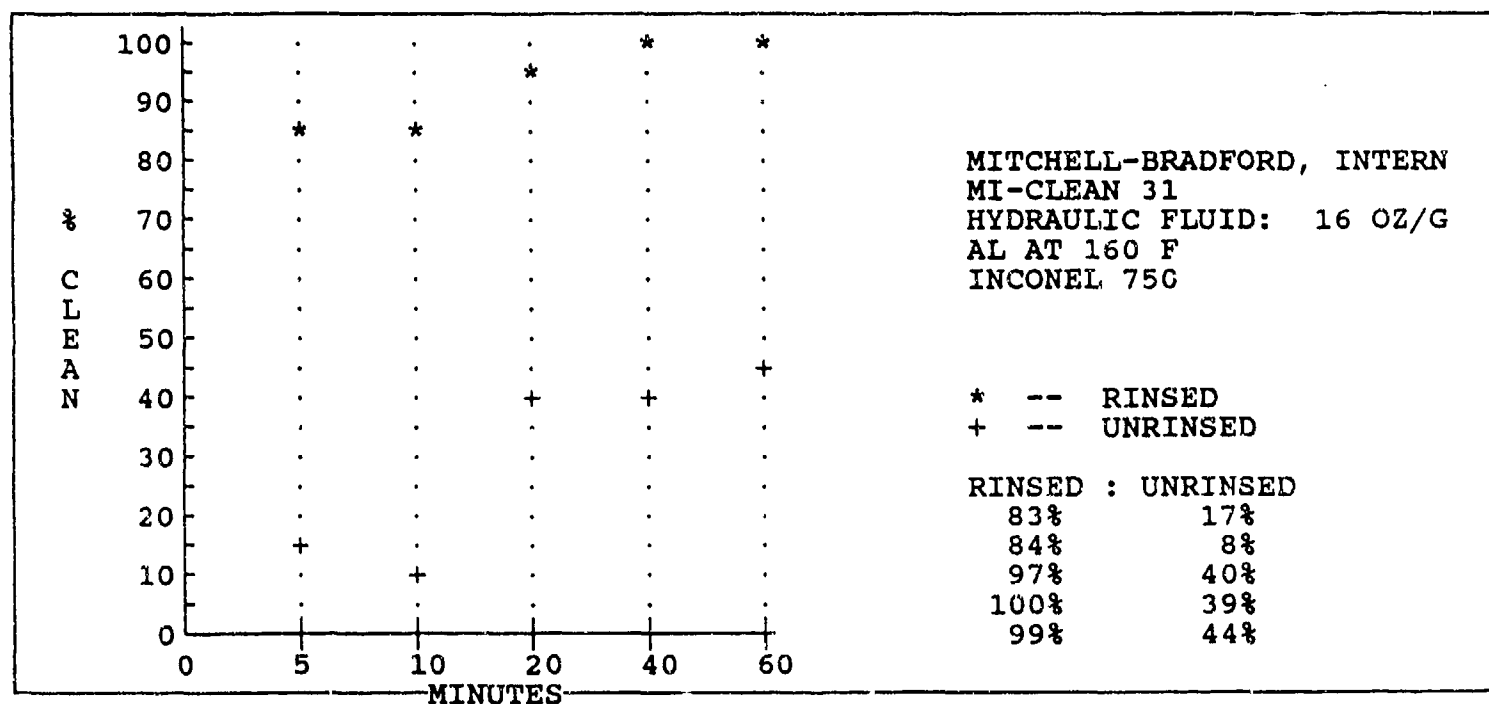
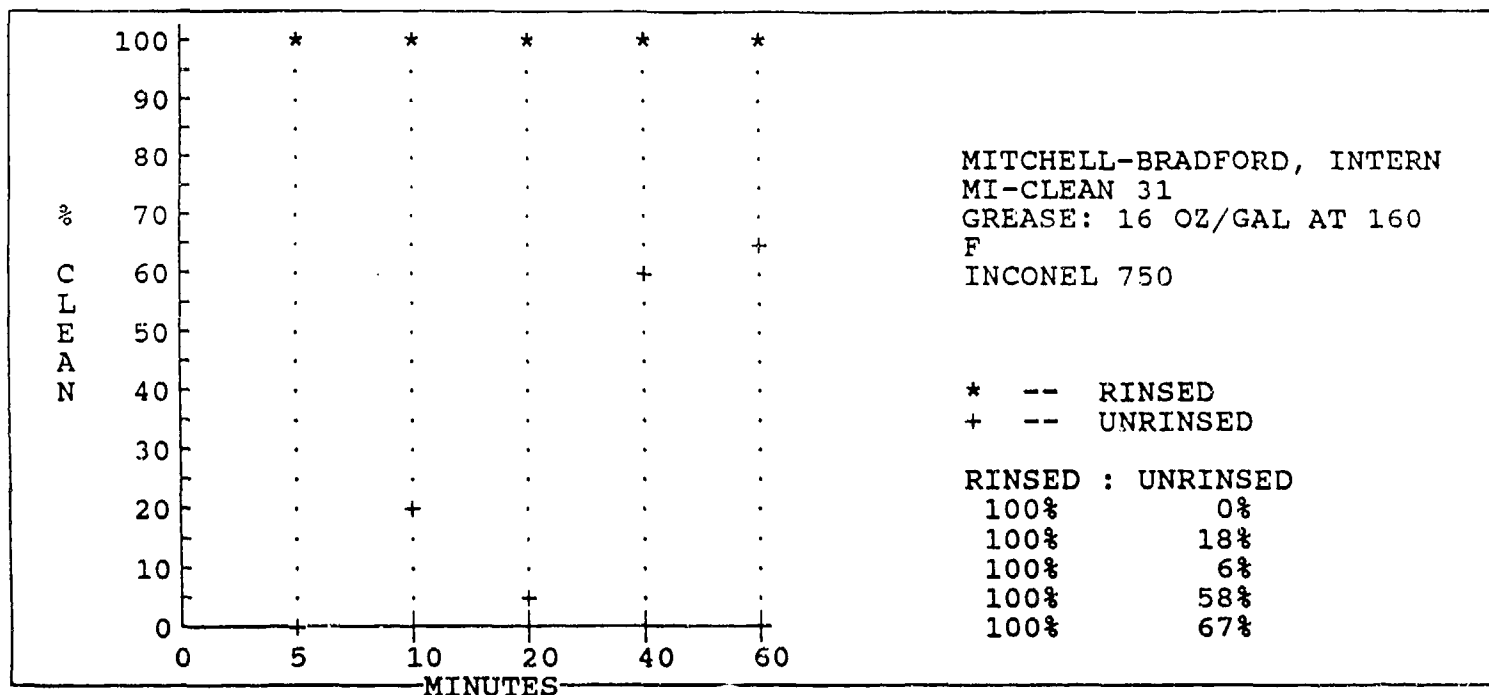
RINSED :	UNRINSED
91%	46%
99%	21%
100%	38%
100%	31%
100%	38%





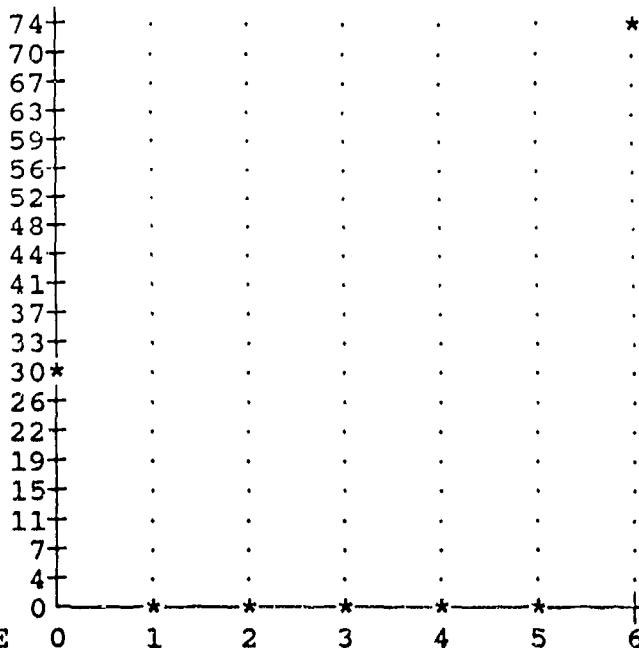






COMPANY - MITCHELL-BRADFORD,
 PRODUCT - MI-CLEAN 59
 TOC INIT- 33229
 TOC 2nd - 0
 COD INIT- 25
 ANILINE PT - 0.0000
 ATP ----- 5 E-8

SOLUBILITY DATA:



0- 28
 1- 0
 2- 0
 3- 0
 4- 0
 5- 0
 6- 74

DRY
 WEIGHT
 0.0975

DATE - 08/04/88

COD vs TIME

0 1 2 3 4 5 6

PHENOL
 08/04/88
 ATP - 76 E-8

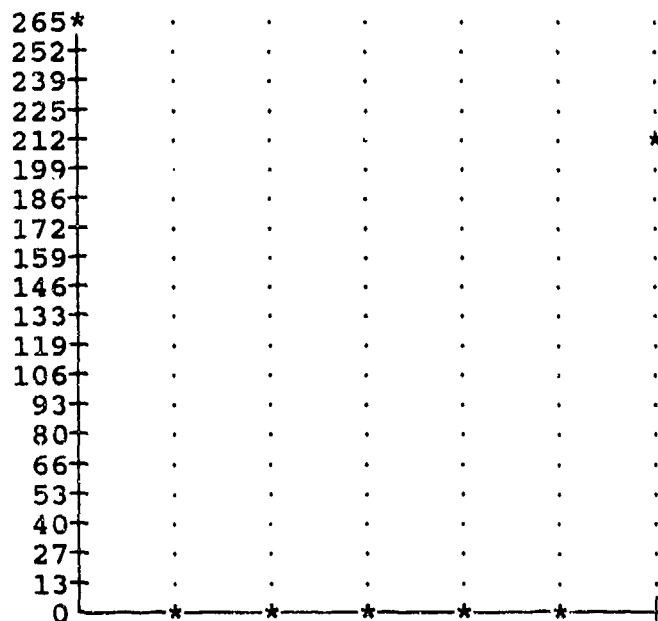
MITCHELL-BRADFORD, INTERN
 MI-CLEAN 100

MITCHELL-BRADFORD, INTERN
 MI-CLEAN 14

MITCHELL-BRADFORD, INTERN
 MI-CLEAN 31

MITCHELL-BRADFORD, INTERN
 MI-CLEAN 59

OAKITE PRODUCTS INC.
 OAKITE ANOPREP



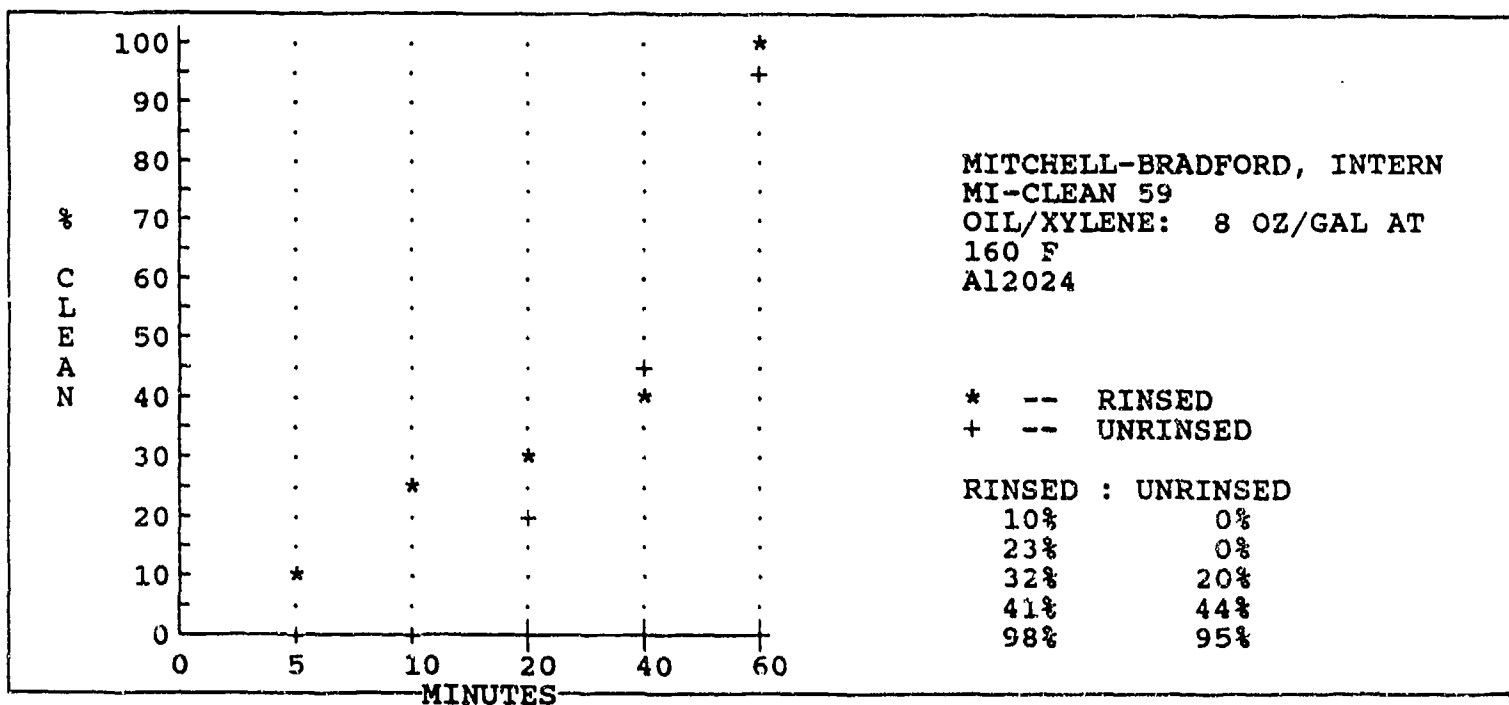
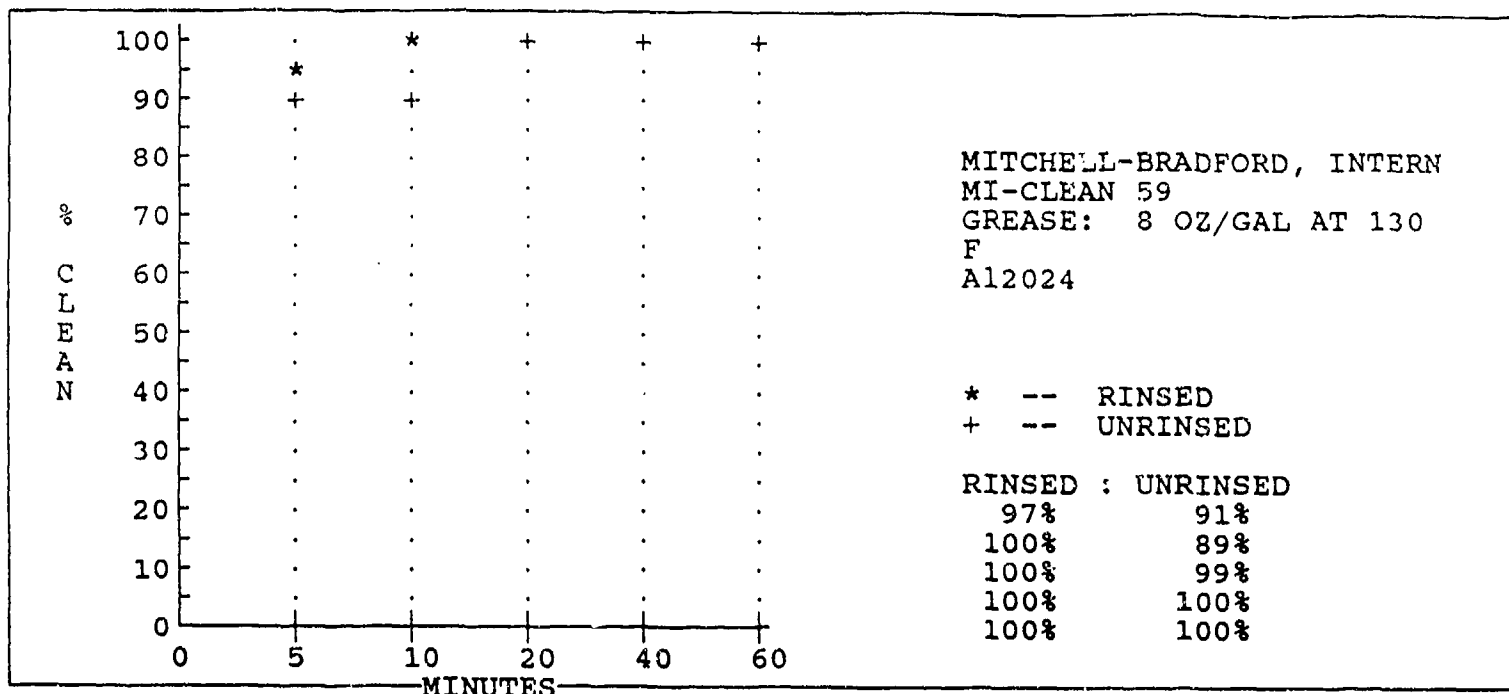
0- 265
 1- 0
 2- 0
 3- 0
 4- 0
 5- 0
 6- 216

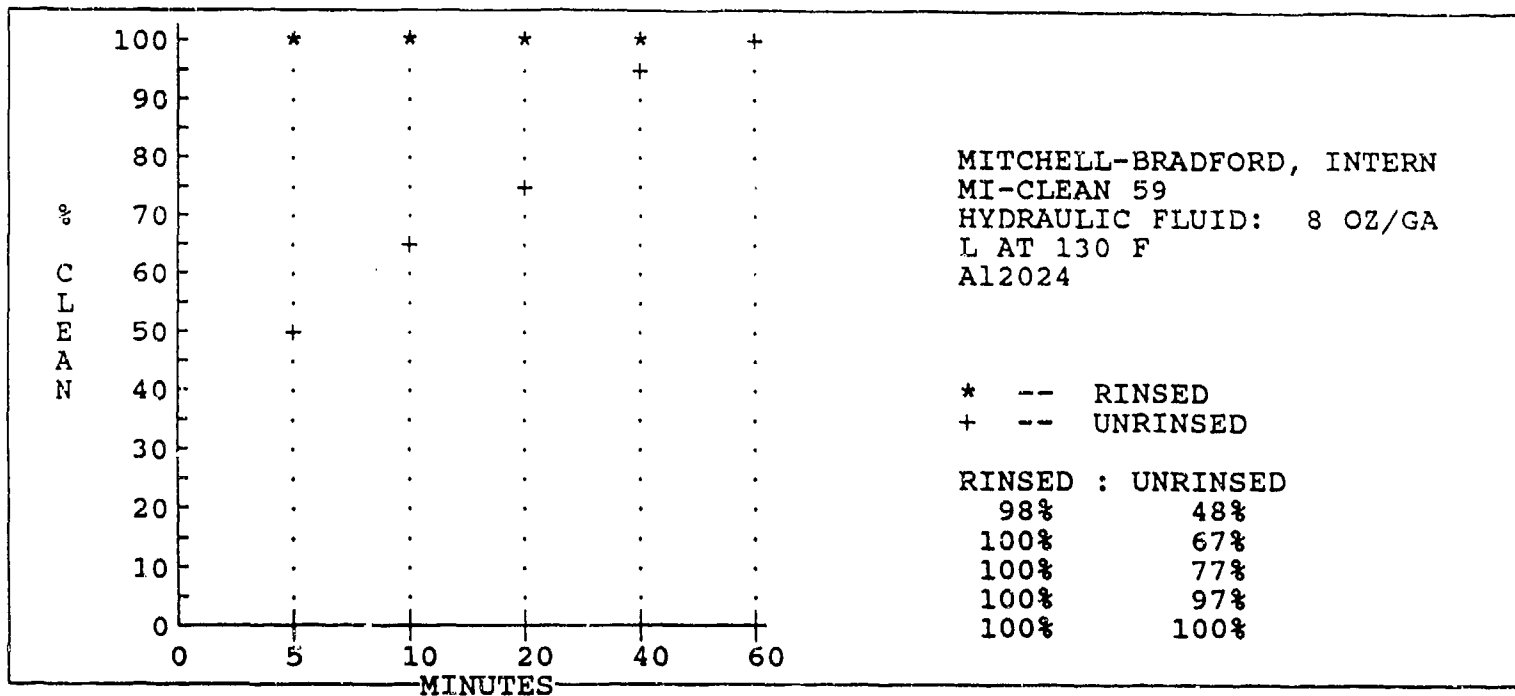
DRY
 WEIGHT
 0.0975

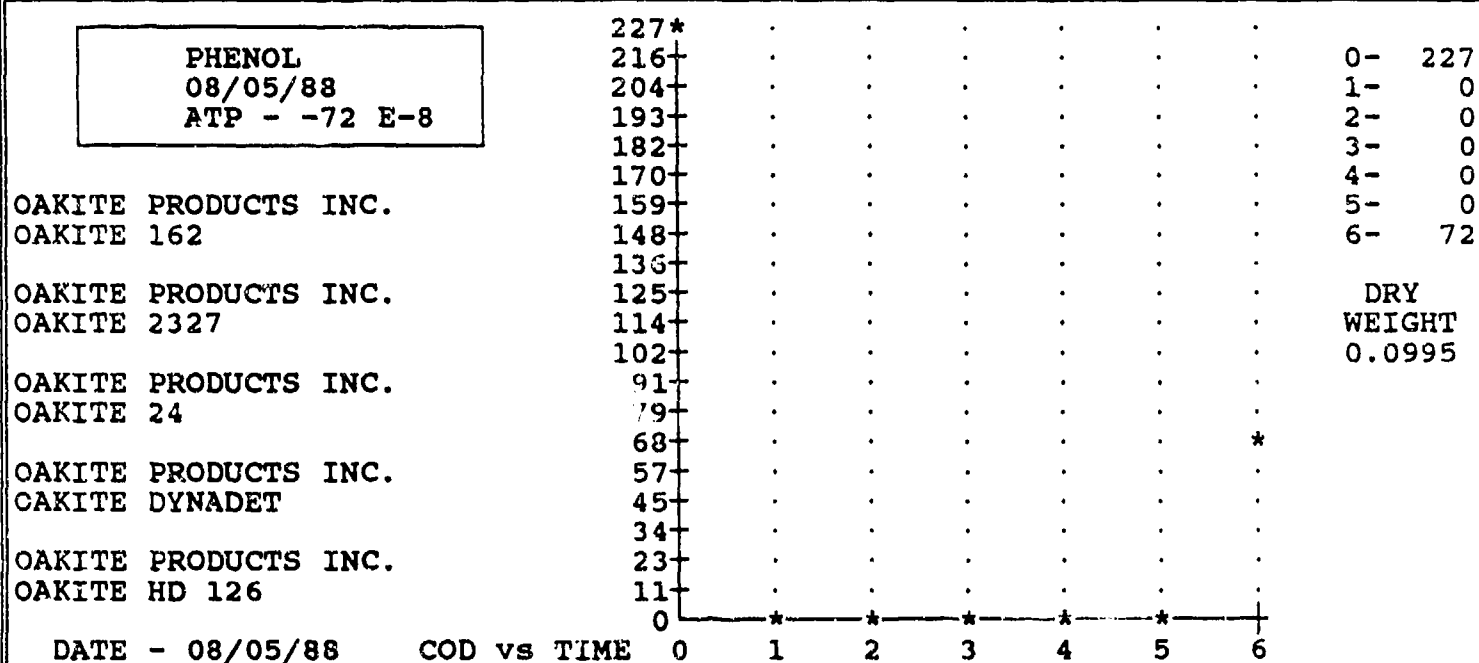
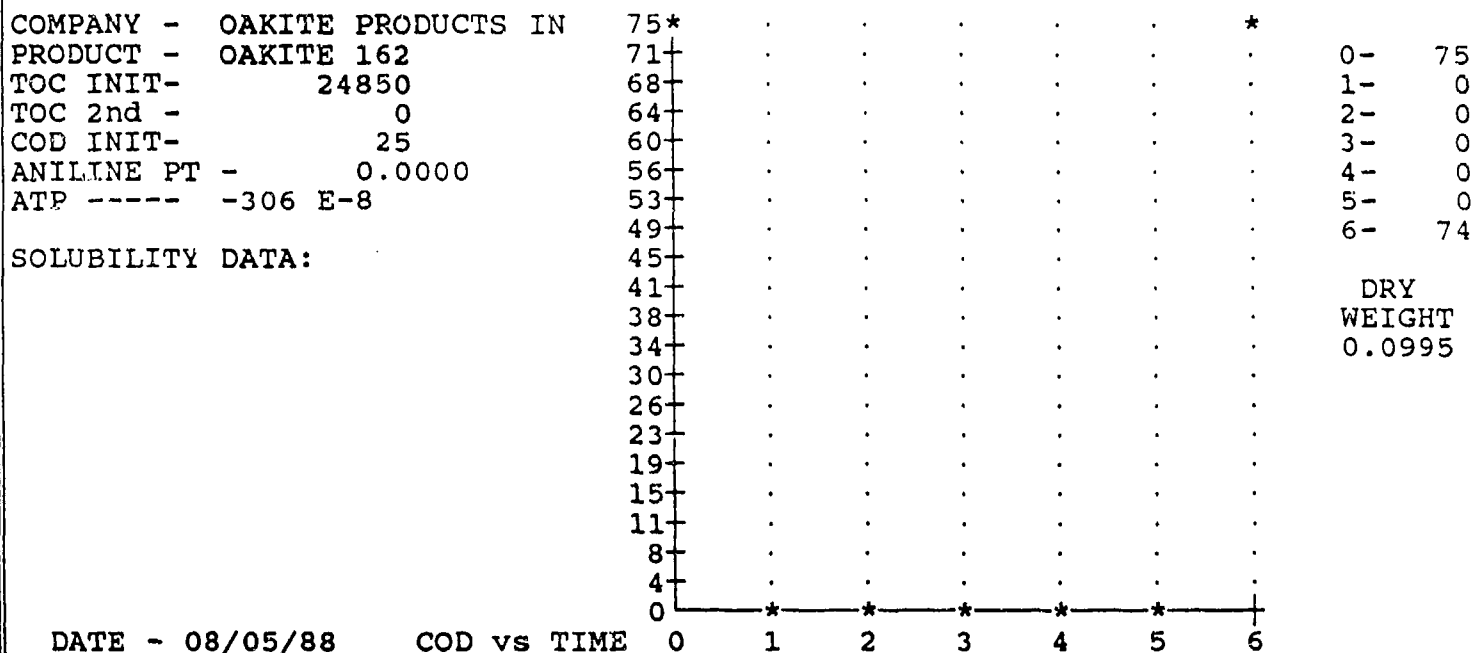
DATE - 08/04/88

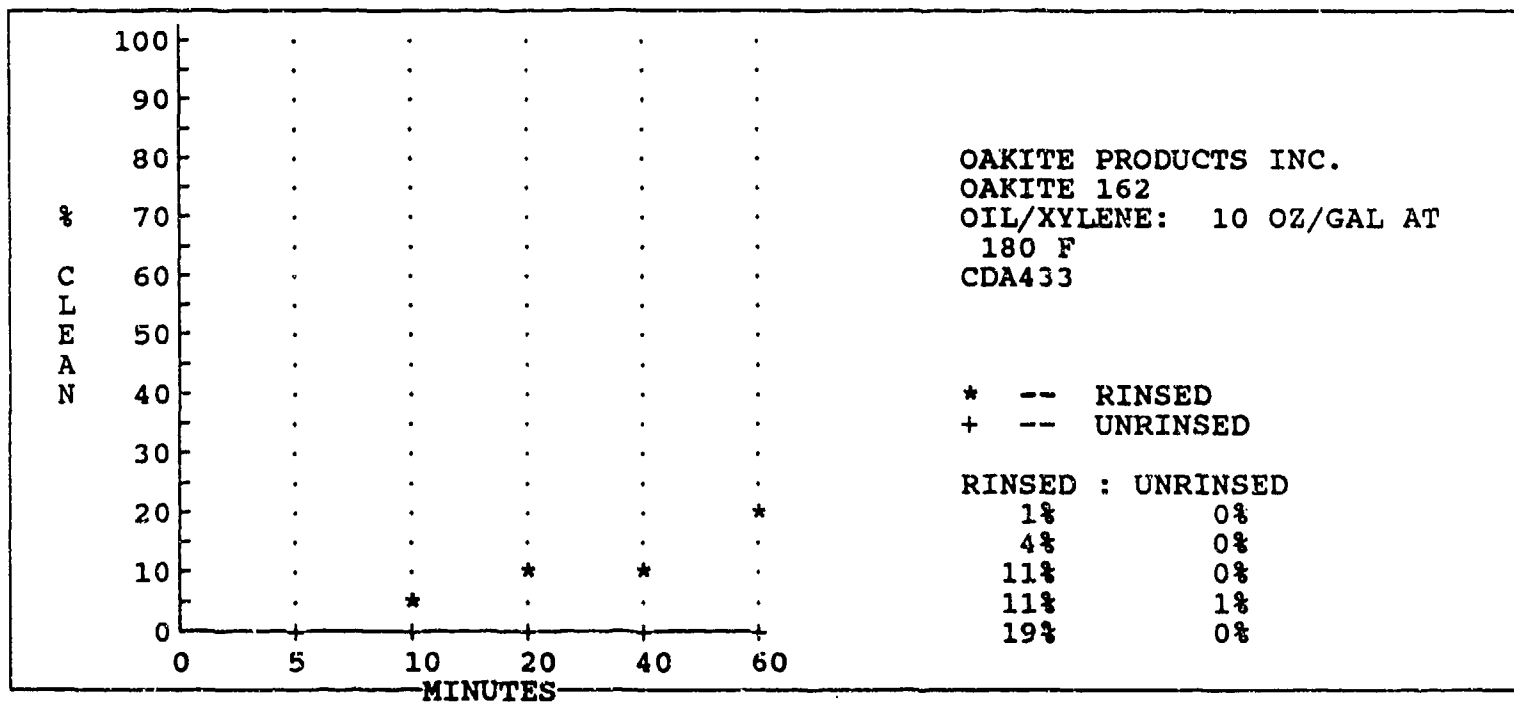
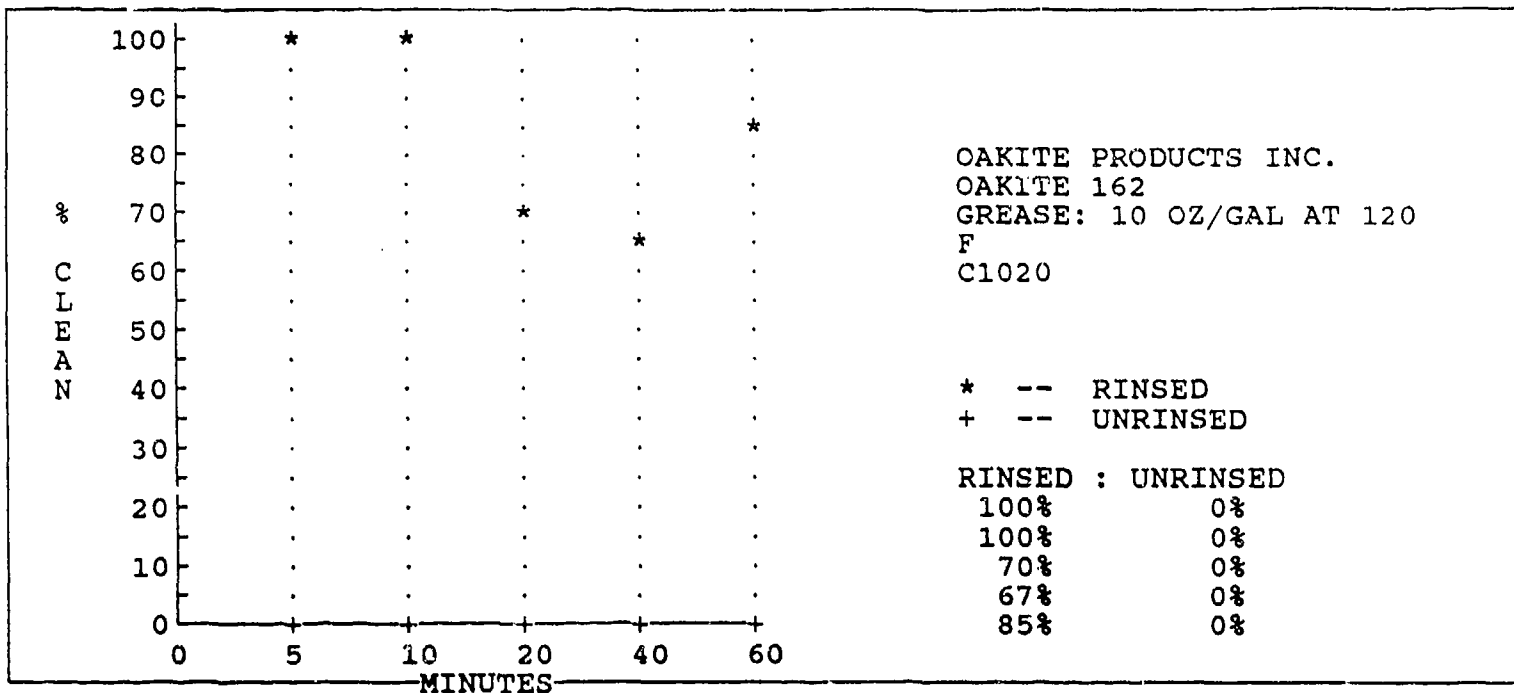
COD vs TIME

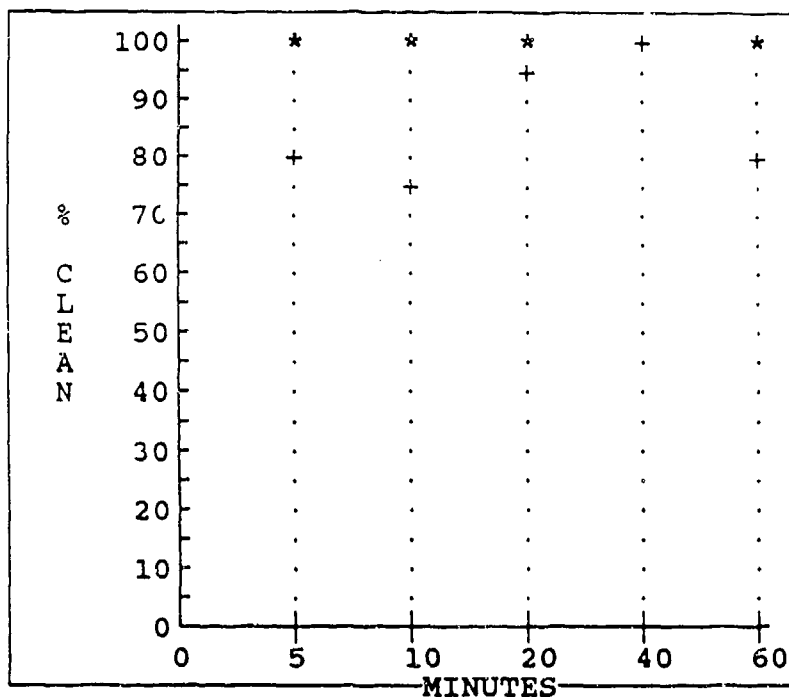
0 1 2 3 4 5 6







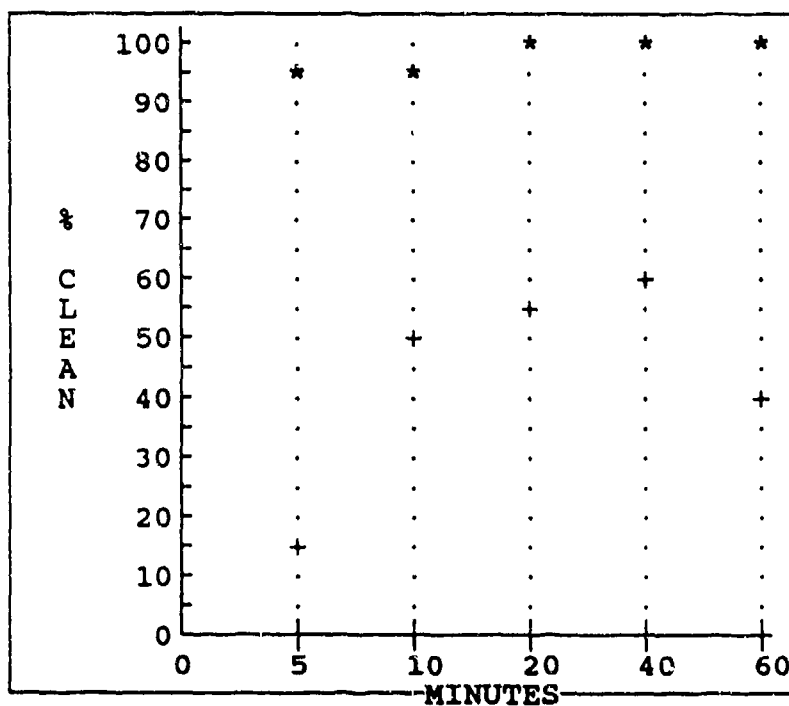




OAKITE PRODUCTS INC.
OAKITE 162
GREASE: 10 OZ/GAL AT 180
F
CDA433

* -- RINSED
+ -- UNRINSED

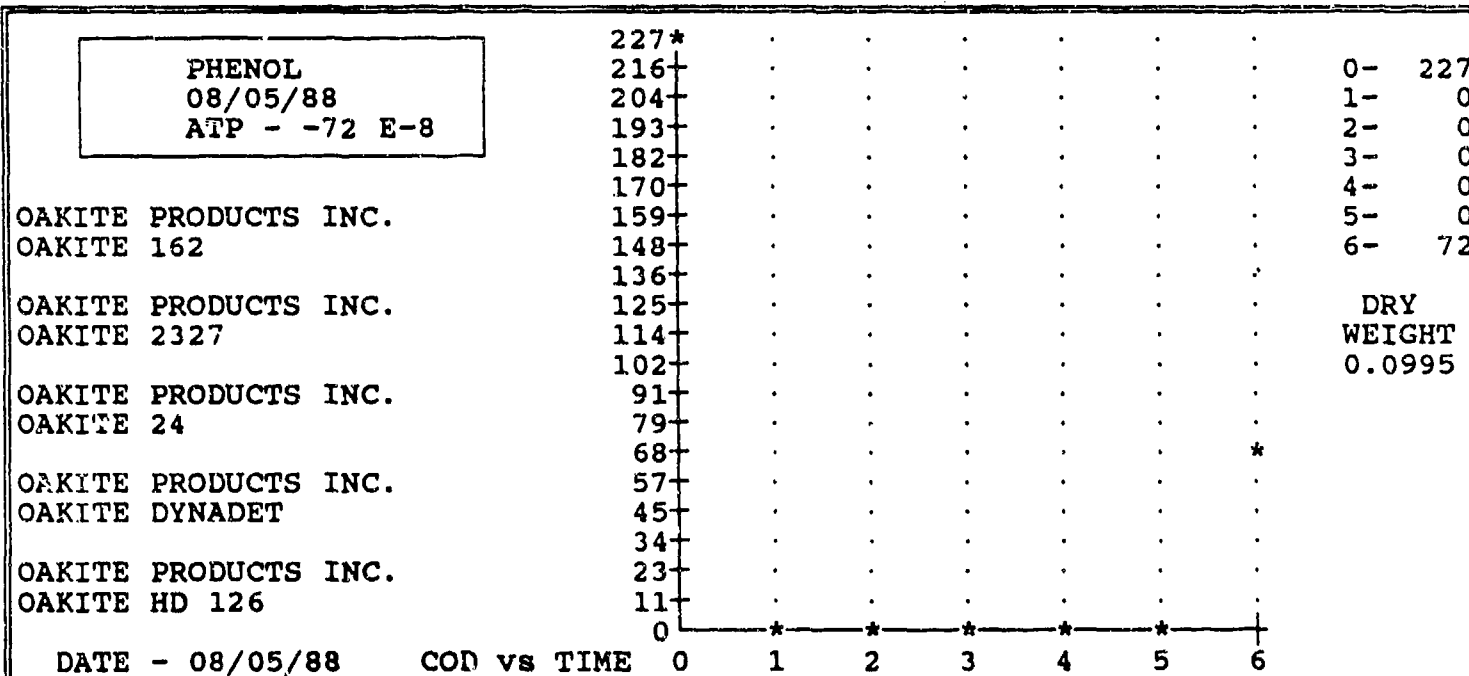
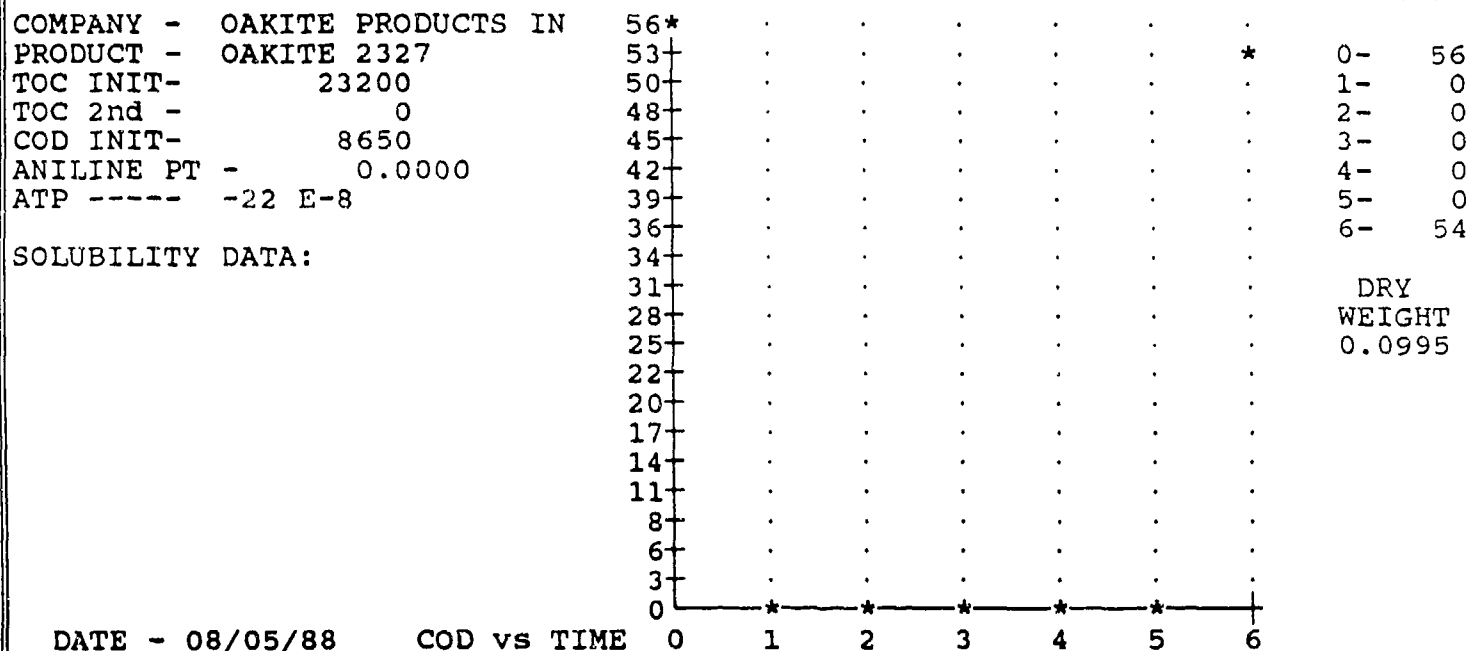
RINSED : UNRINSED
100% 80%
100% 76%
100% 93%
100% 100%
100% 79%

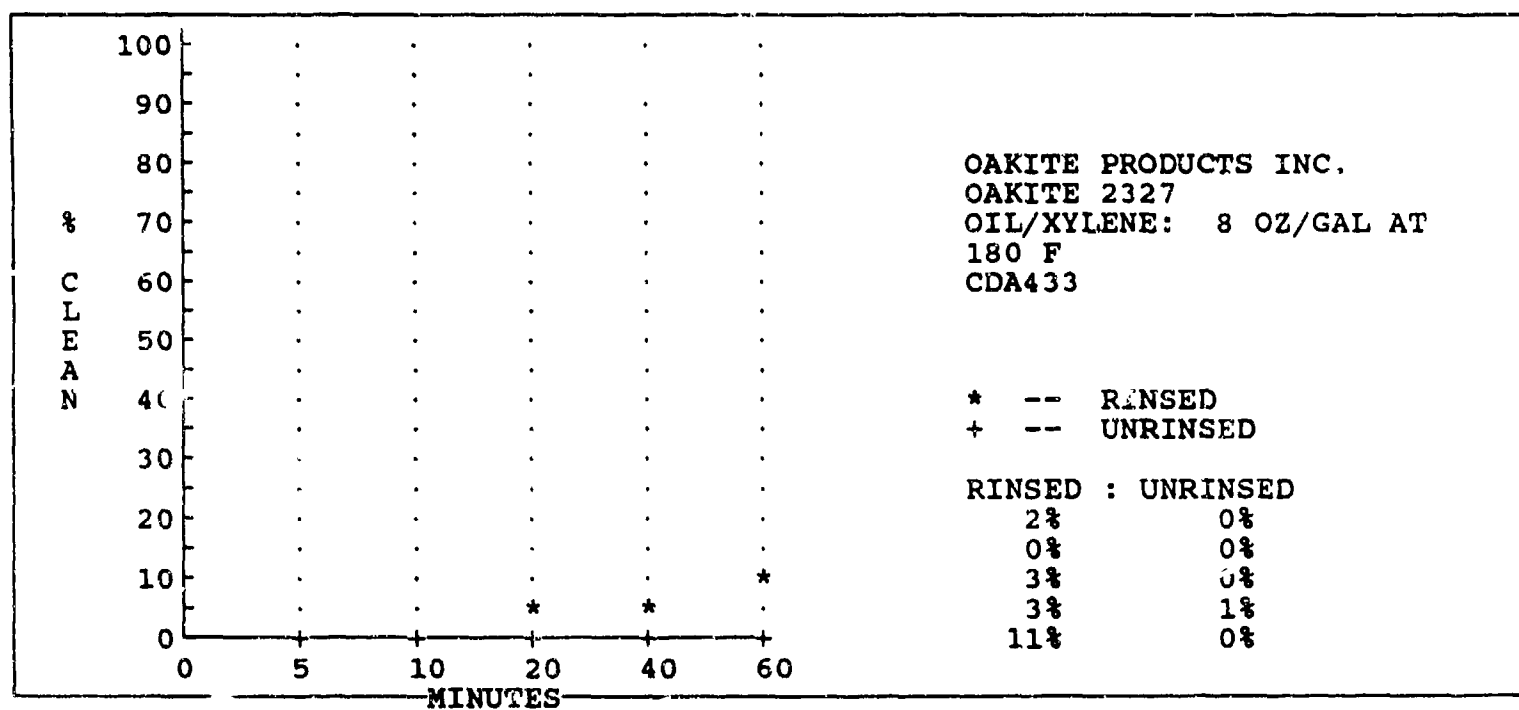
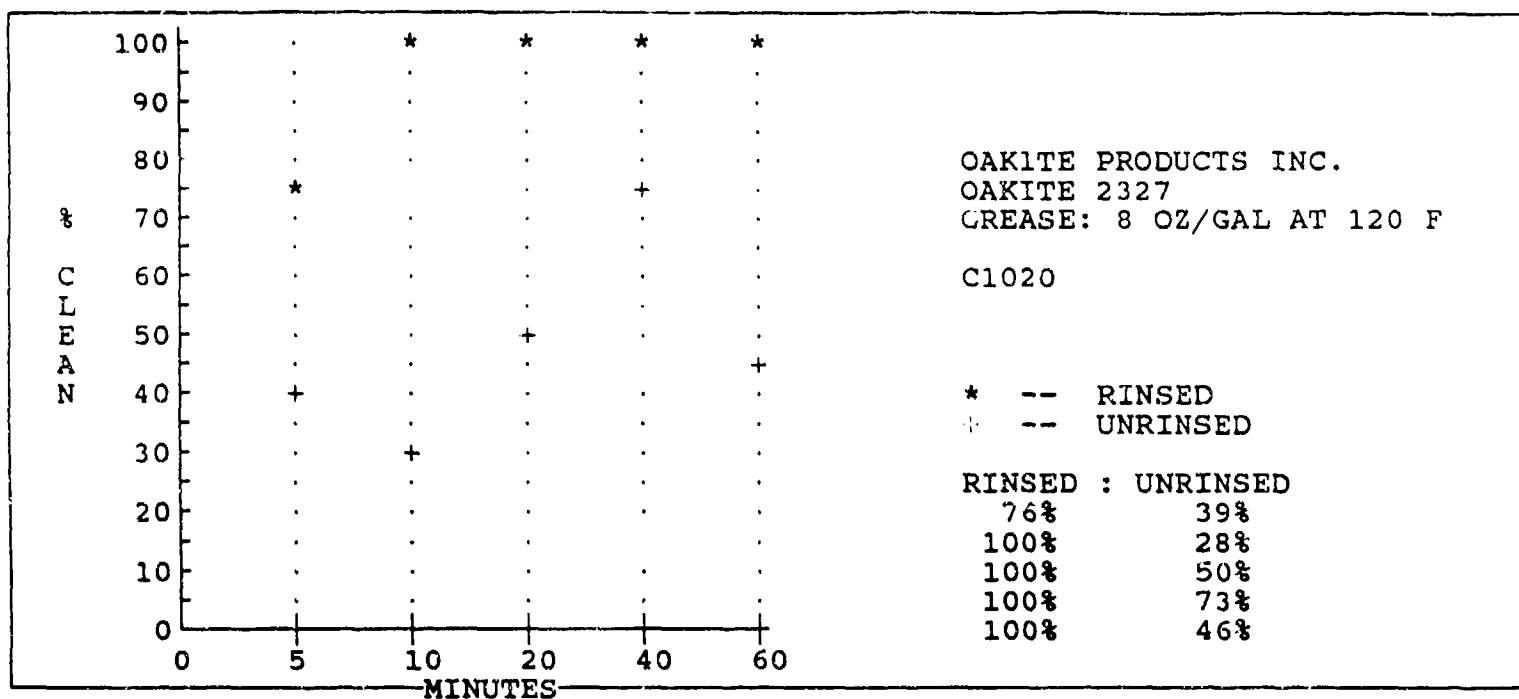


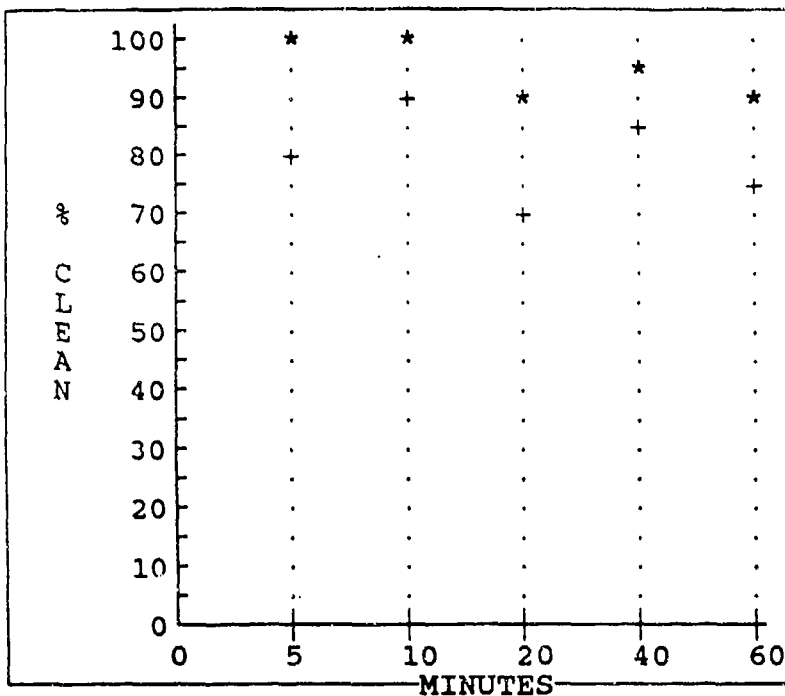
OAKITE PRODUCTS INC.
OAKITE 162
HYDRAULIC FLUID: 10 OZ/G
AL AT 180 F
310S

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED
97% 16%
97% 49%
100% 56%
100% 60%
100% 43%



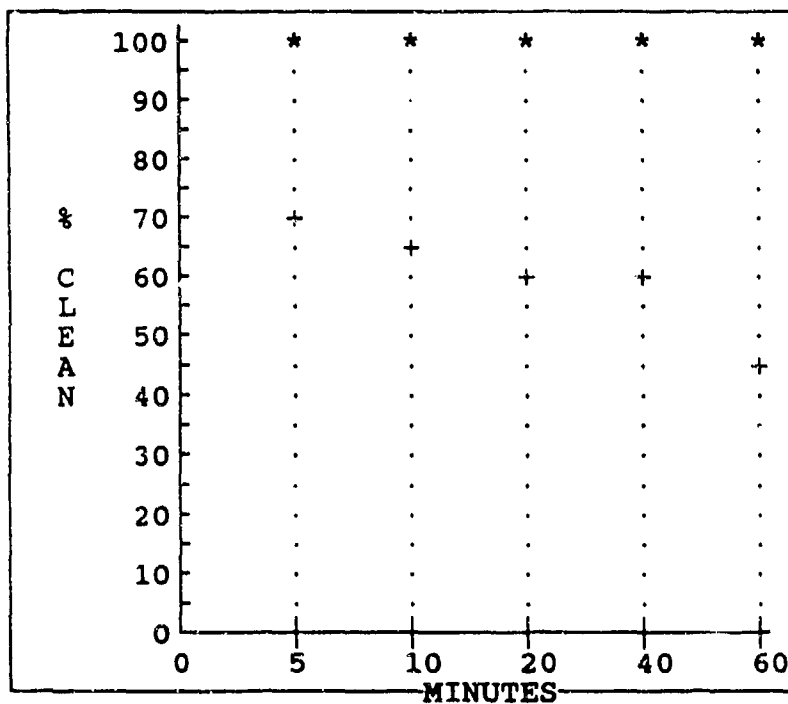




OAKITE PRODUCTS INC.
OAKITE 2327
GREASE: 8 OZ/GAL AT 180
F
310S

* -- RINSED
+ -- UNRINSED

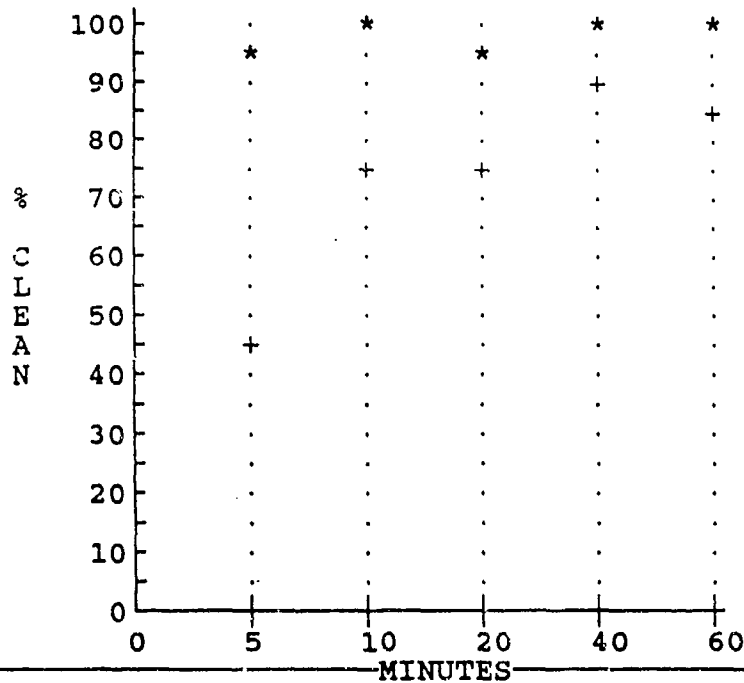
RINSED : UNRINSED	
99%	81%
99%	91%
93%	73%
94%	83%
92%	77%



OAKITE PRODUCTS INC.
OAKITE 2327
HYDRAULIC FLUID: 8 OZ/GAL AT 180 F
C1020

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED	
100%	70%
100%	67%
100%	62%
100%	62%
99%	47%



OAKITE PRODUCTS INC.
 OAKITE 2327
 HYDRAULIC FLUID: 8 OZ/GA
 L AT 120 F
 Az31B

* -- RINSED
 + -- UNRINSED

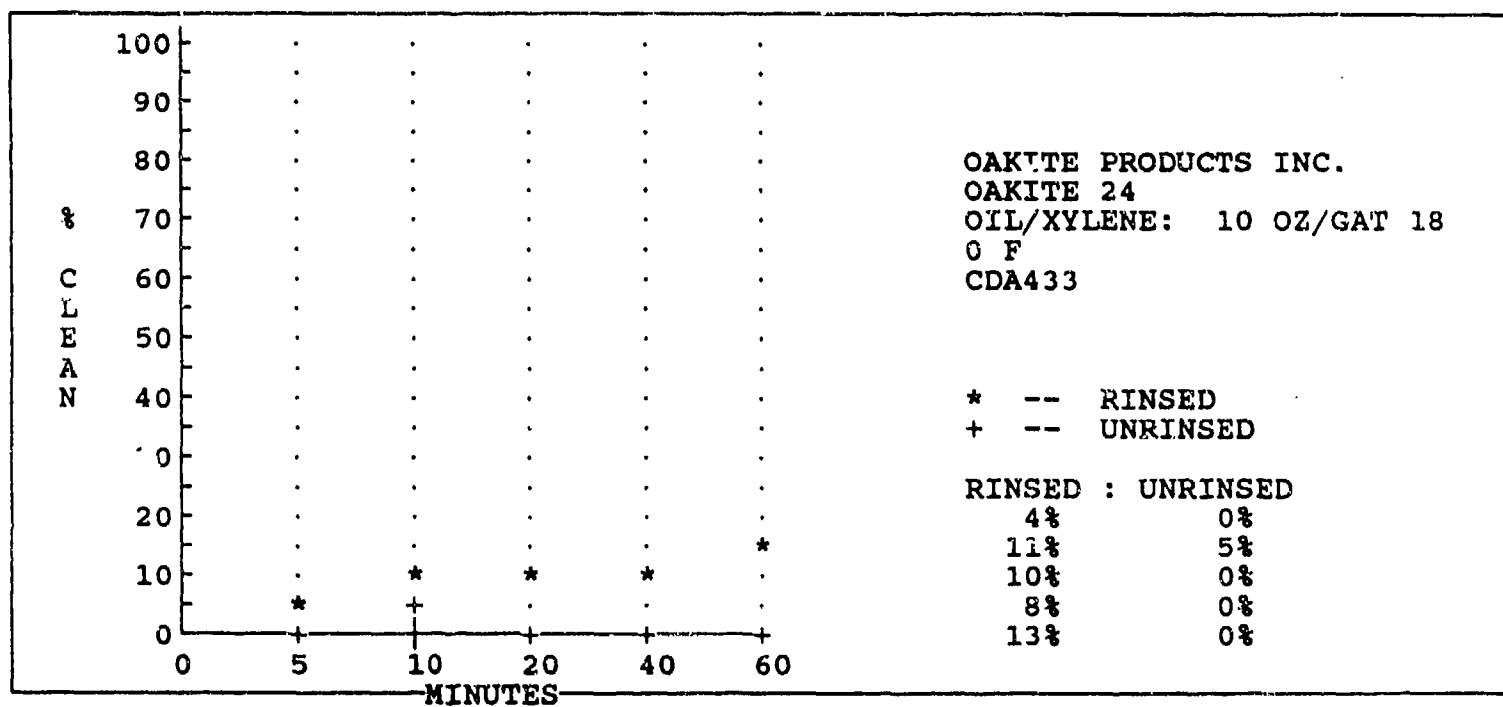
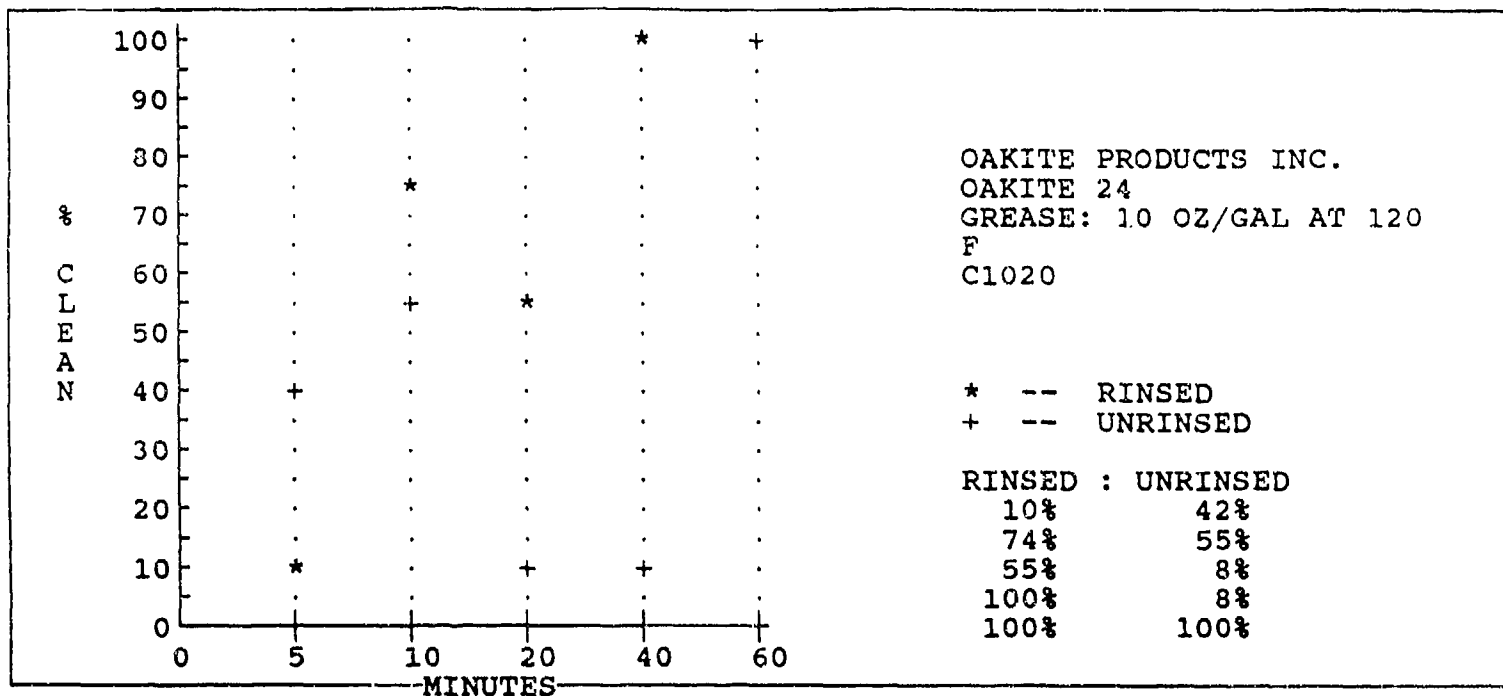
RINSED : UNRINSED	
94%	44%
98%	74%
97%	75%
100%	89%
100%	86%

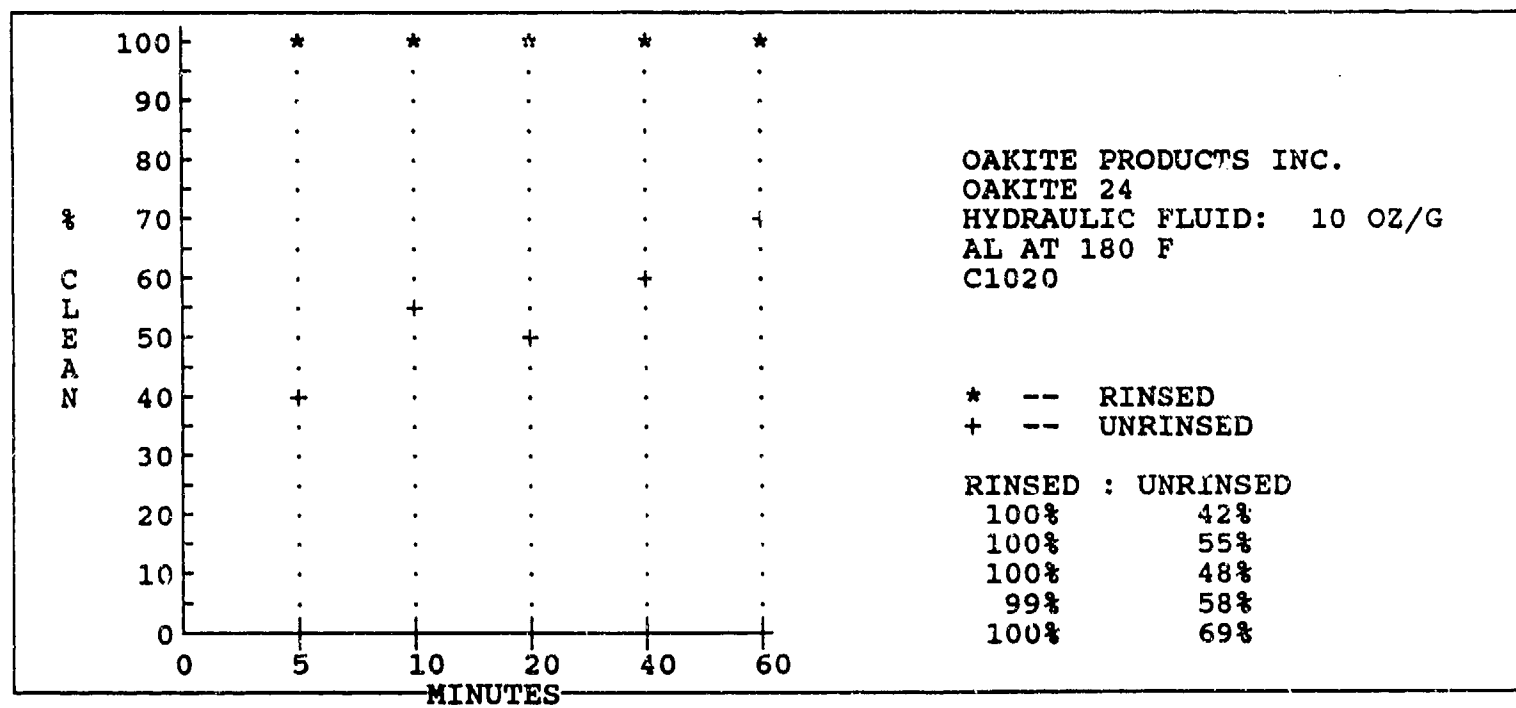
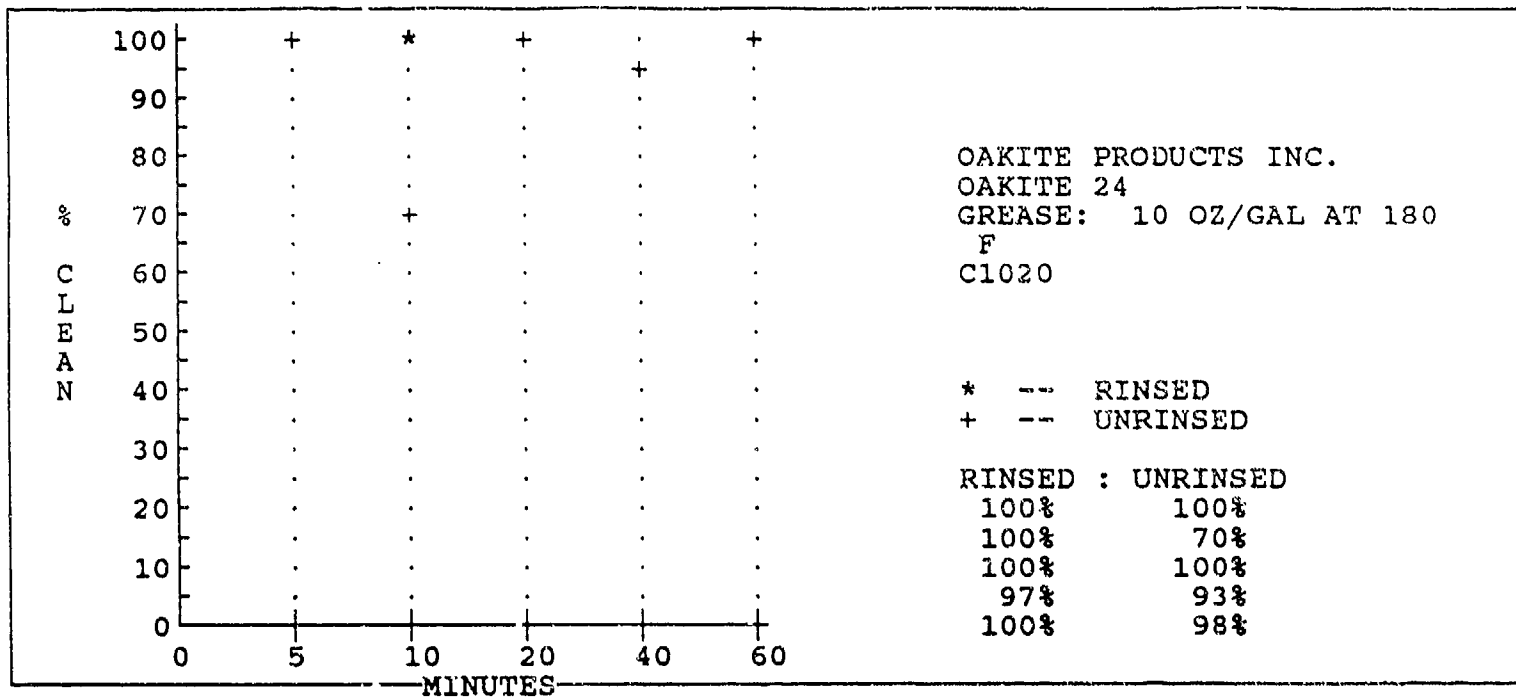
COMPANY - OAKITE PRODUCTS IN	84*	.	.	.	.	.	.	0-	84
PRODUCT - OAKITE 24	80	.	.	.	.	.	.	1-	0
TOC INIT- 57370	76	.	.	.	.	.	.	2-	0
TOC 2nd - 0	71	.	.	.	.	.	.	3-	0
COD INIT- 16450	67	.	.	.	.	.	.	4-	0
ANILINE PT - 0.0000	63	.	.	.	.	.	.	5-	0
ATP ----- -9 E-8	59	.	.	.	.	.	.	6-	40
	55	.	.	.	.	.	.
SOLUBILITY DATA:	50	.	.	.	.	.	.
	46	.	.	.	.	.	.	DRY	
	42	.	.	.	.	.	*	WEIGHT	
	38	.	.	.	.	.	.	0.0995	
	34	.	.	.	.	.	.
	29	.	.	.	.	.	.
	25	.	.	.	.	.	.
	21	.	.	.	.	.	.
	17	.	.	.	.	.	.
	13	.	.	.	.	.	.
	8	.	.	.	.	.	.
	4	.	.	.	.	.	.
	0	*	*	*	*	*	*		

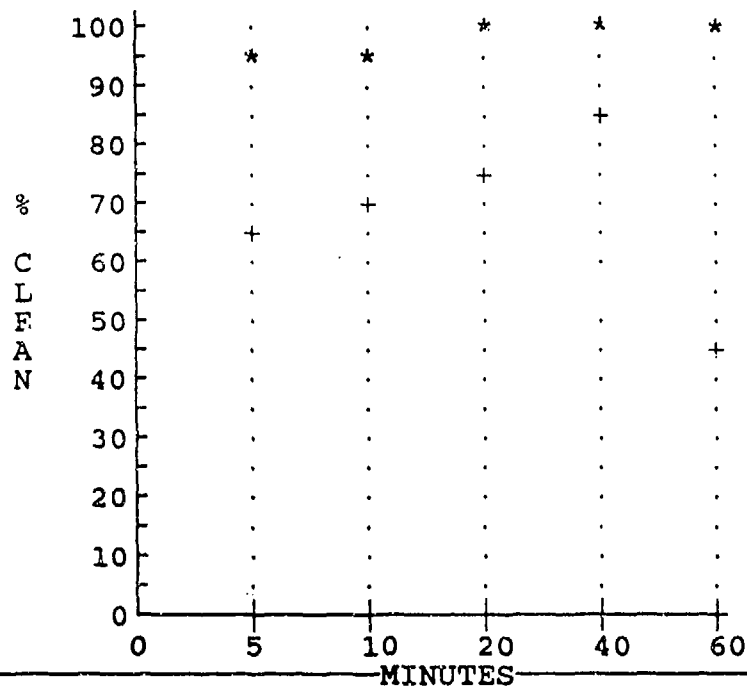
DATE - 08/05/88 COD vs TIME 0 1 2 3 4 5 6

<div style="border: 1px solid black; padding: 5px; display: inline-block;"> PHENOL 08/05/88 ATP - -72 E-8 </div>		227*	0-	227
		216	.	.	.	.	.	1-	0
		204	.	.	.	.	.	2-	0
		193	.	.	.	.	.	3-	0
		182	.	.	.	.	.	4-	0
		170	.	.	.	.	.	5-	0
OAKITE PRODUCTS INC.		159	.	.	.	.	.	6-	72
OAKITE 162		148	.	.	.	.	.
		136	.	.	.	.	.
OAKITE PRODUCTS INC.		125	.	.	.	.	.	DRY	
OAKITE 2327		114	.	.	.	.	.	WEIGHT	
		102	.	.	.	.	.	0.0995	
OAKITE PRODUCTS INC.		91	.	.	.	.	.
OAKITE 24		79	.	.	.	.	.
		68	.	.	.	.	*
OAKITE PRODUCTS INC.		57	.	.	.	.	.
OAKITE DYNADET		45	.	.	.	.	.
		34	.	.	.	.	.
OAKITE PRODUCTS INC.		23	.	.	.	.	.
OAKITE HD 126		11	.	.	.	.	.
		0	*	*	*	*	*			

DATE - 08/05/88 COD vs TIME 0 1 2 3 4 5 6



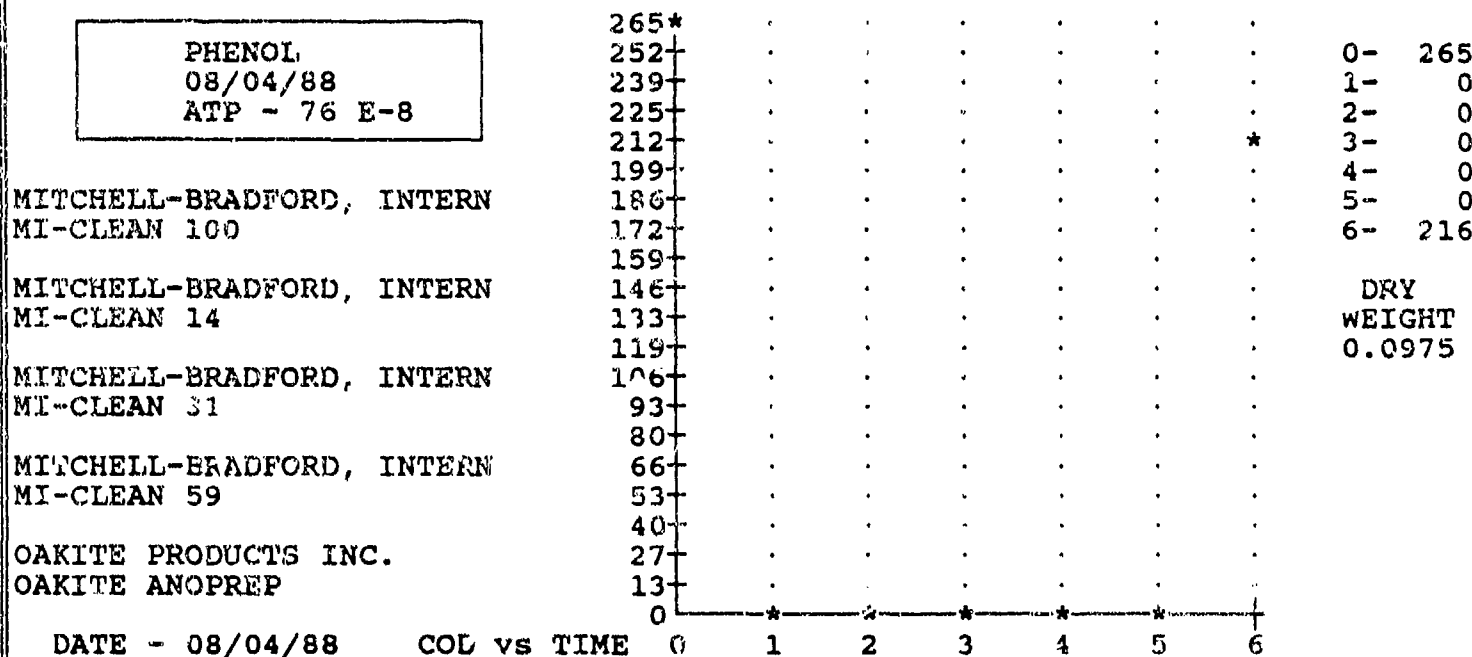
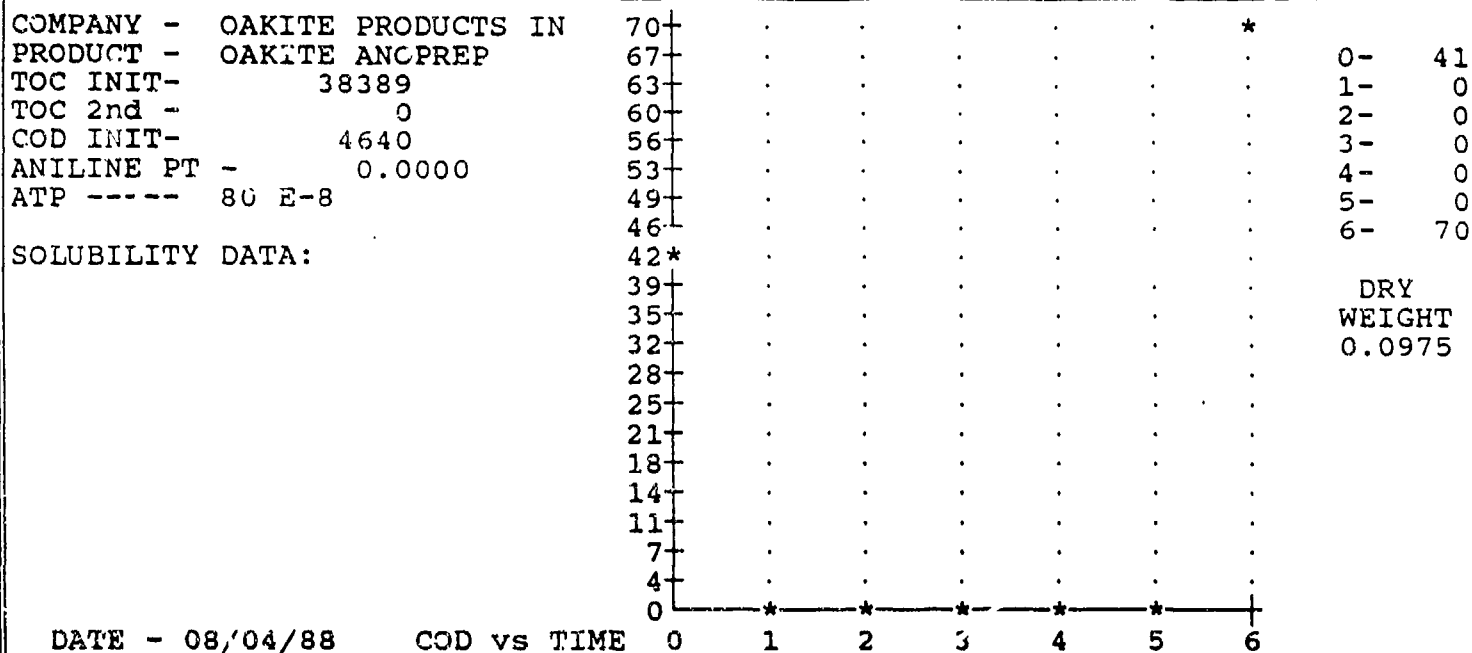




OAKITE PRODUCTS INC.
OAKITE 24
HYDRAULIC FLUID: 10 OZ/G
AL AT 120 F
310S

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED
95% 67%
97% 71%
98% 76%
98% 85%
98% 46%

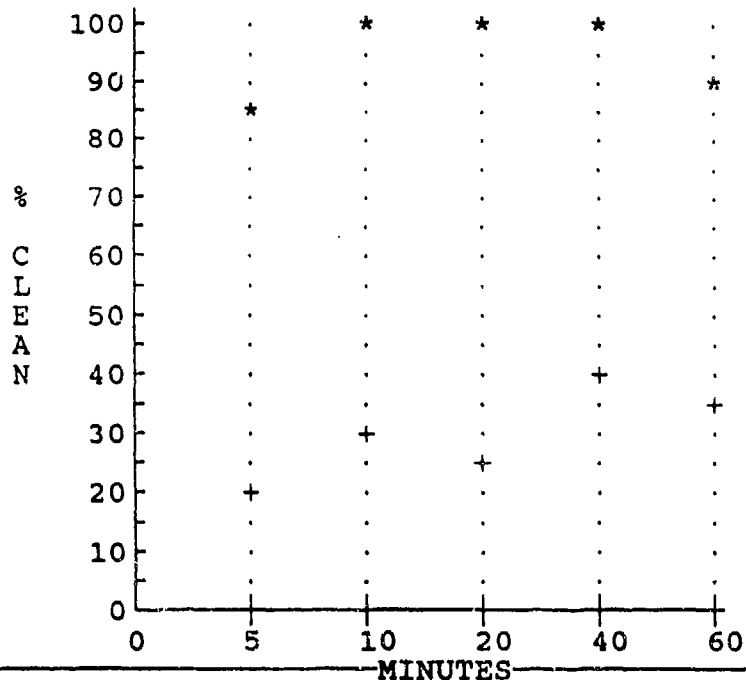


OAKITE PRODUCTS INC.
OAKITE ANOPREP
GEASE: 8 OZ/GAL AT 100 F

INCONEL 750

* -- RINSED
+ -- UNRINSED

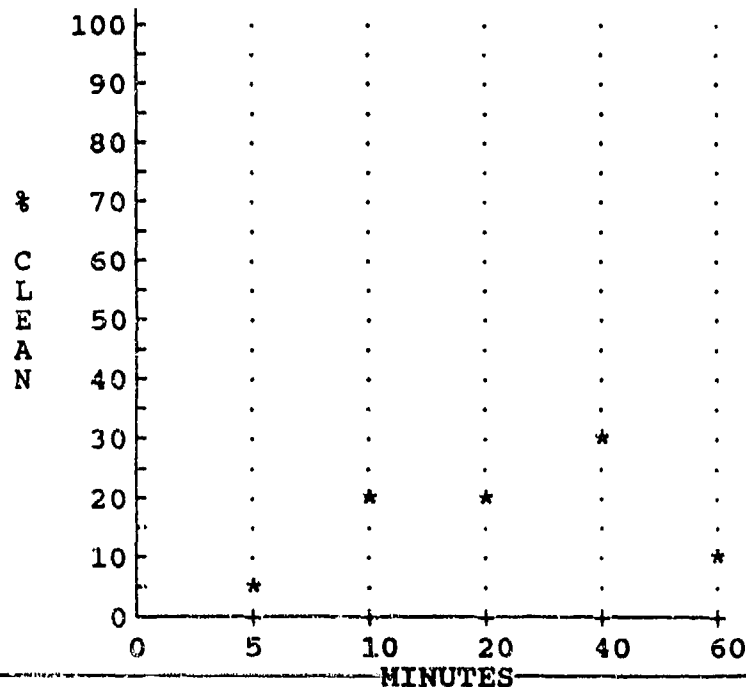
RINSED : UNRINSED	
85%	21%
100%	31%
100%	23%
100%	40%
93%	36%

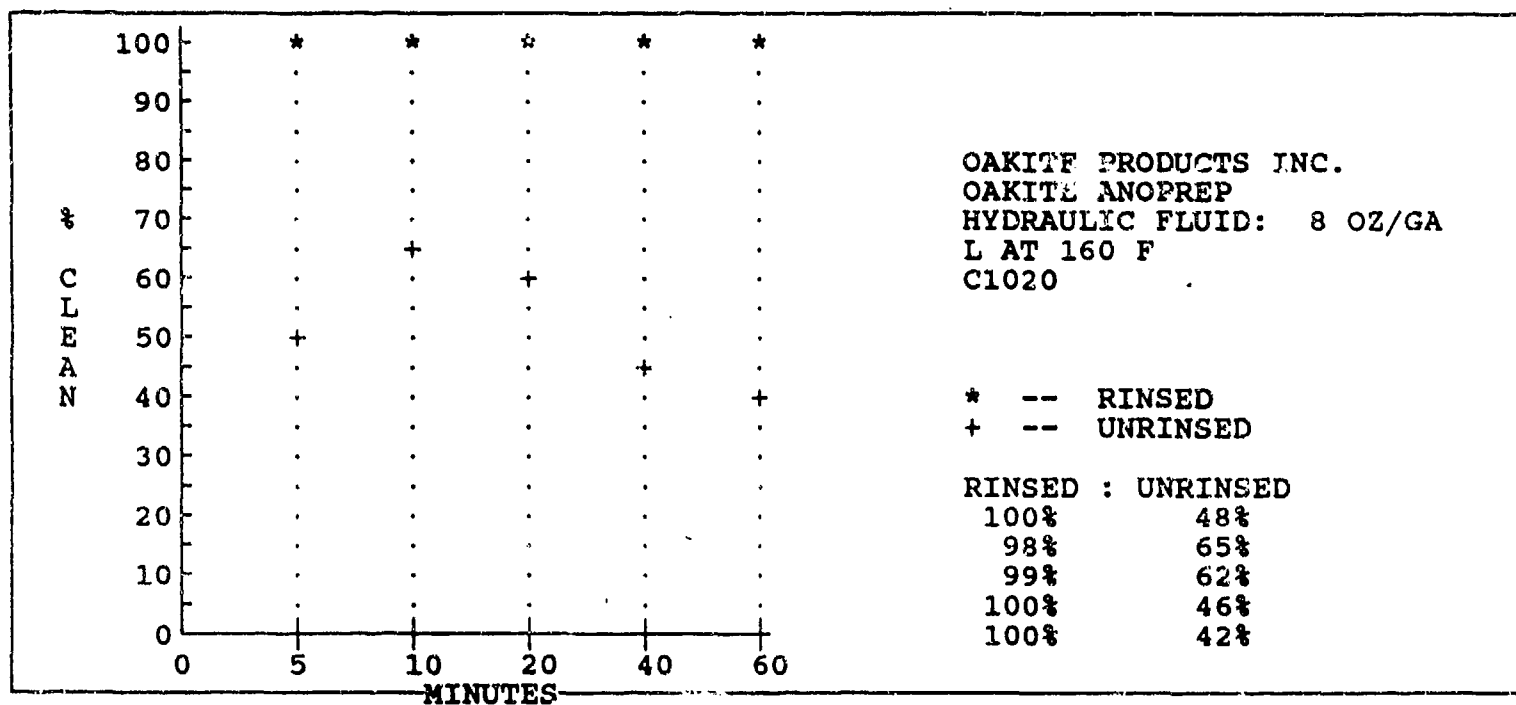
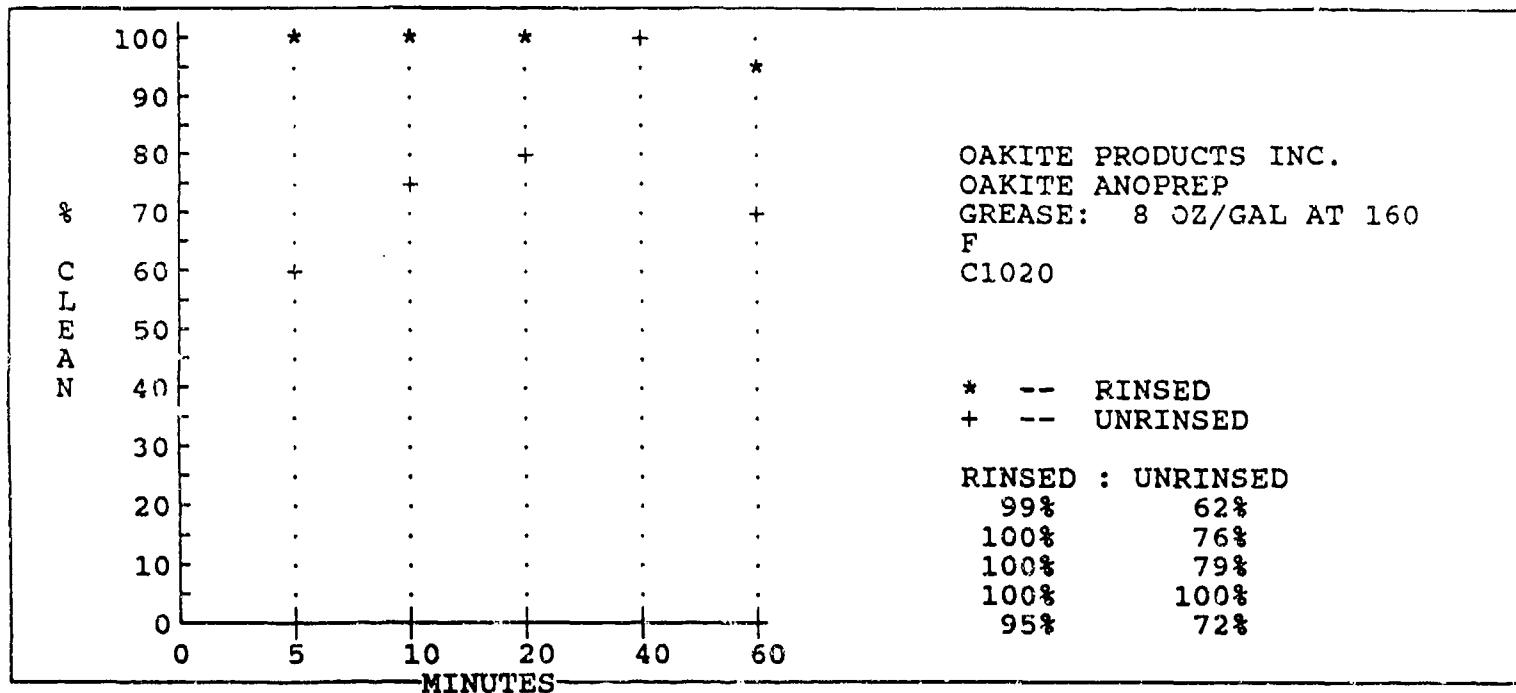


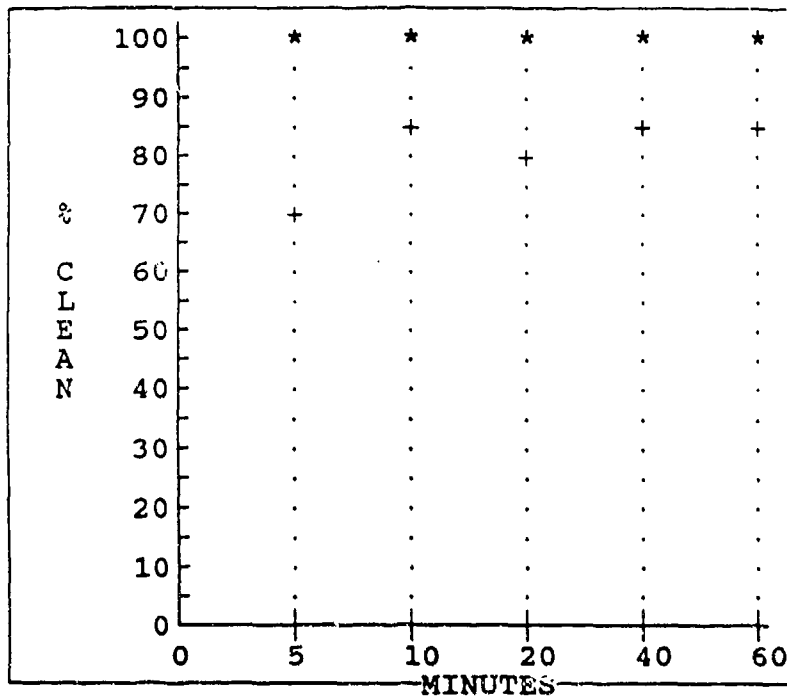
OAKITE PRODUCTS INC.
OAKITE ANOPREP
OIL/XYLENE: 8 OZ/GAL AT
180 F
310S

* -- RINSED
+ -- UNRINSED

RINSED : UNRINSED	
4%	0%
20%	0%
22%	0%
29%	0%
9%	0%







OAKITE PRODUCTS INC.
 OAKITE ANOPREP
 HYDRAULIC FLUID: 8 OZ/GA
 L AT AMBIENT
 310S

* -- RINSED
 + -- UNRINSED

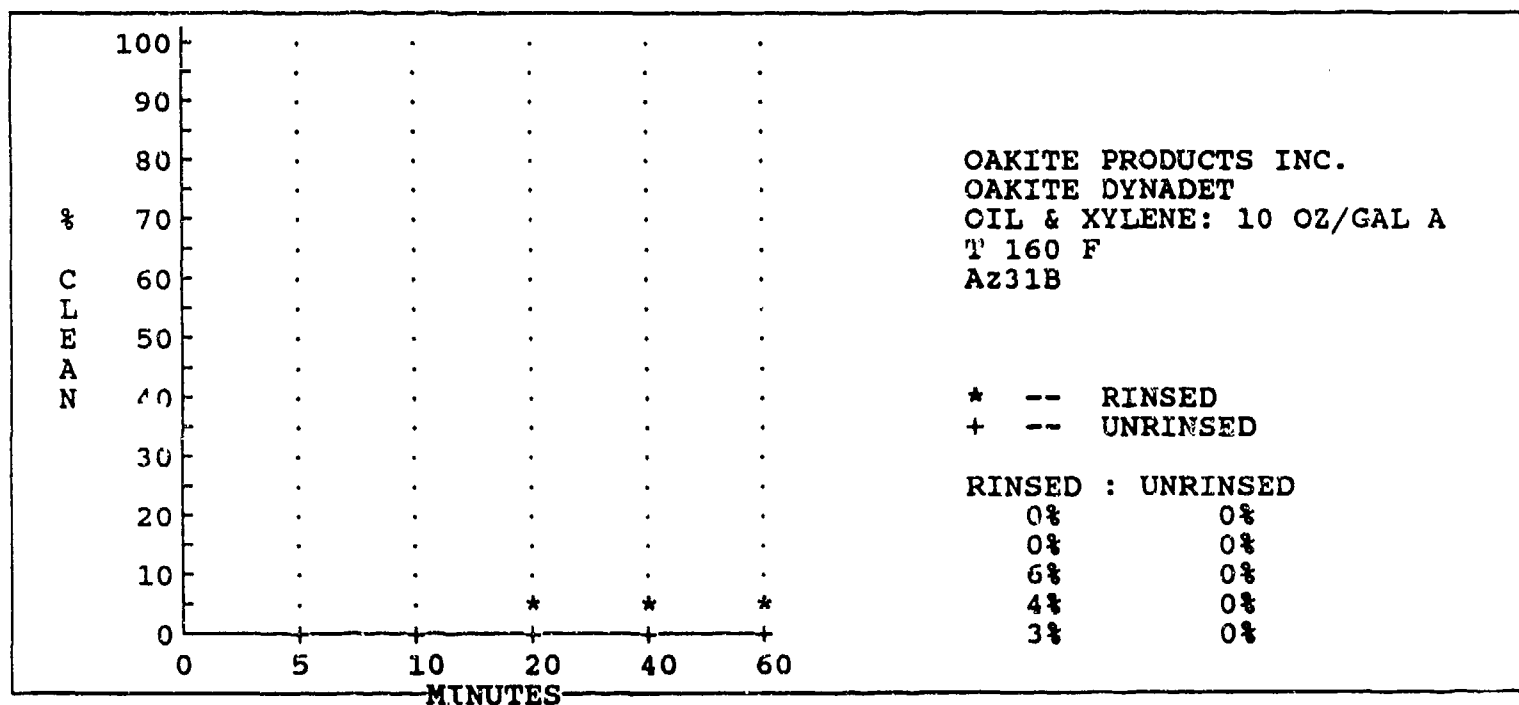
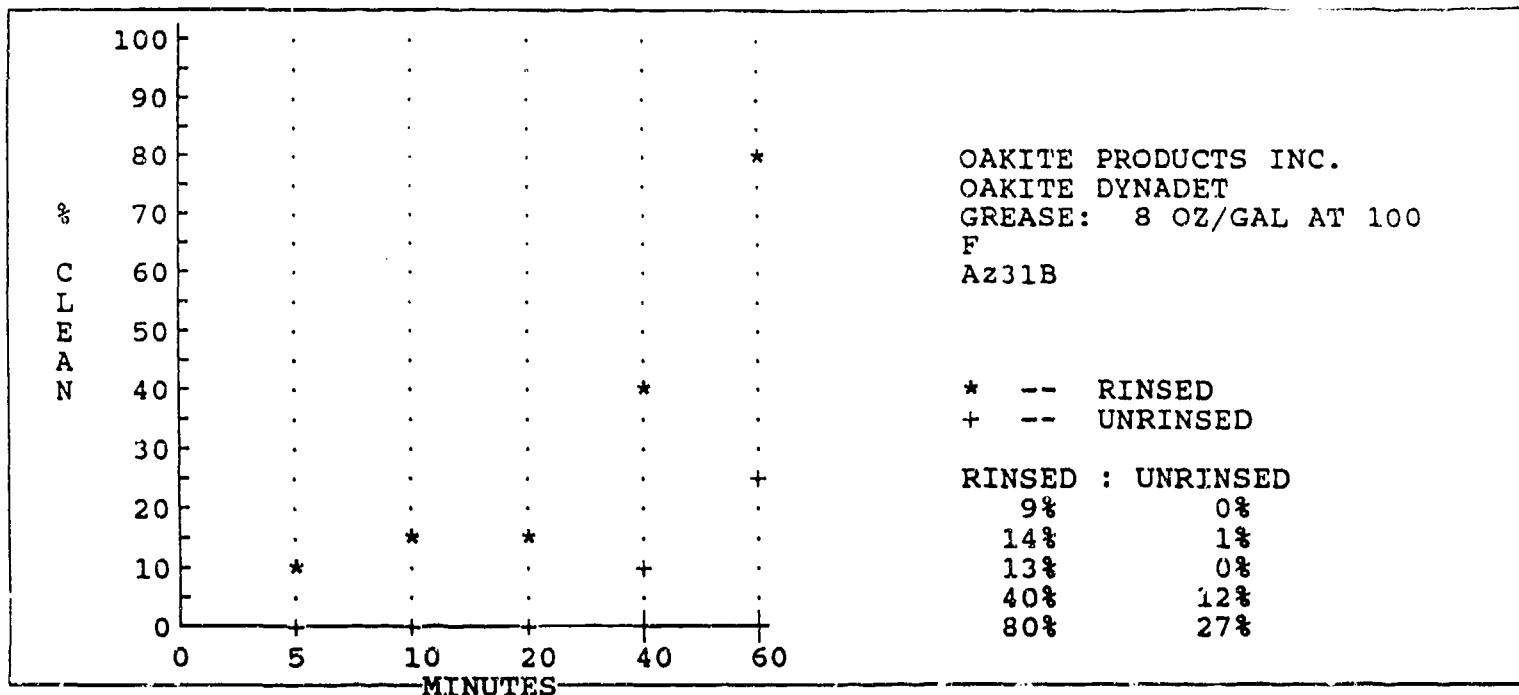
RINSED : UNRINSED	
100%	72%
100%	84%
100%	81%
100%	85%
100%	84%

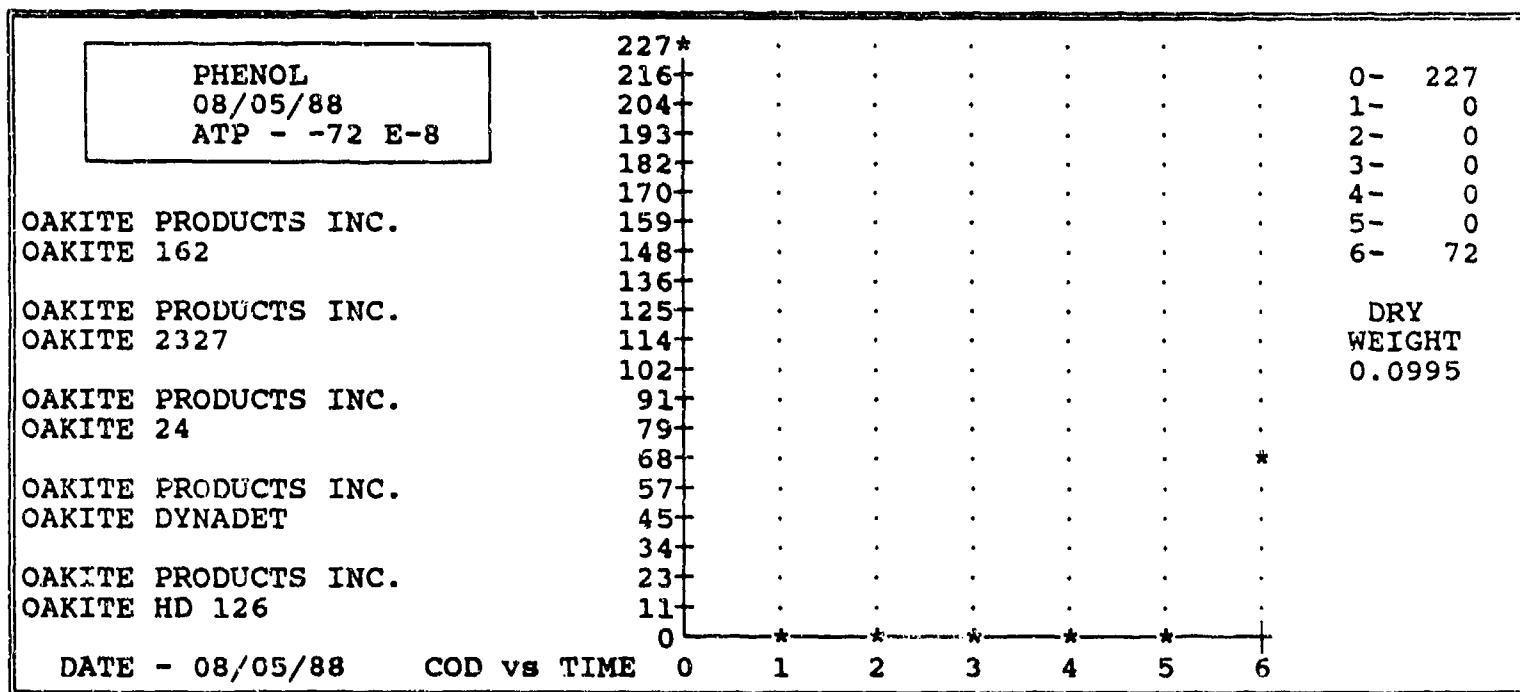
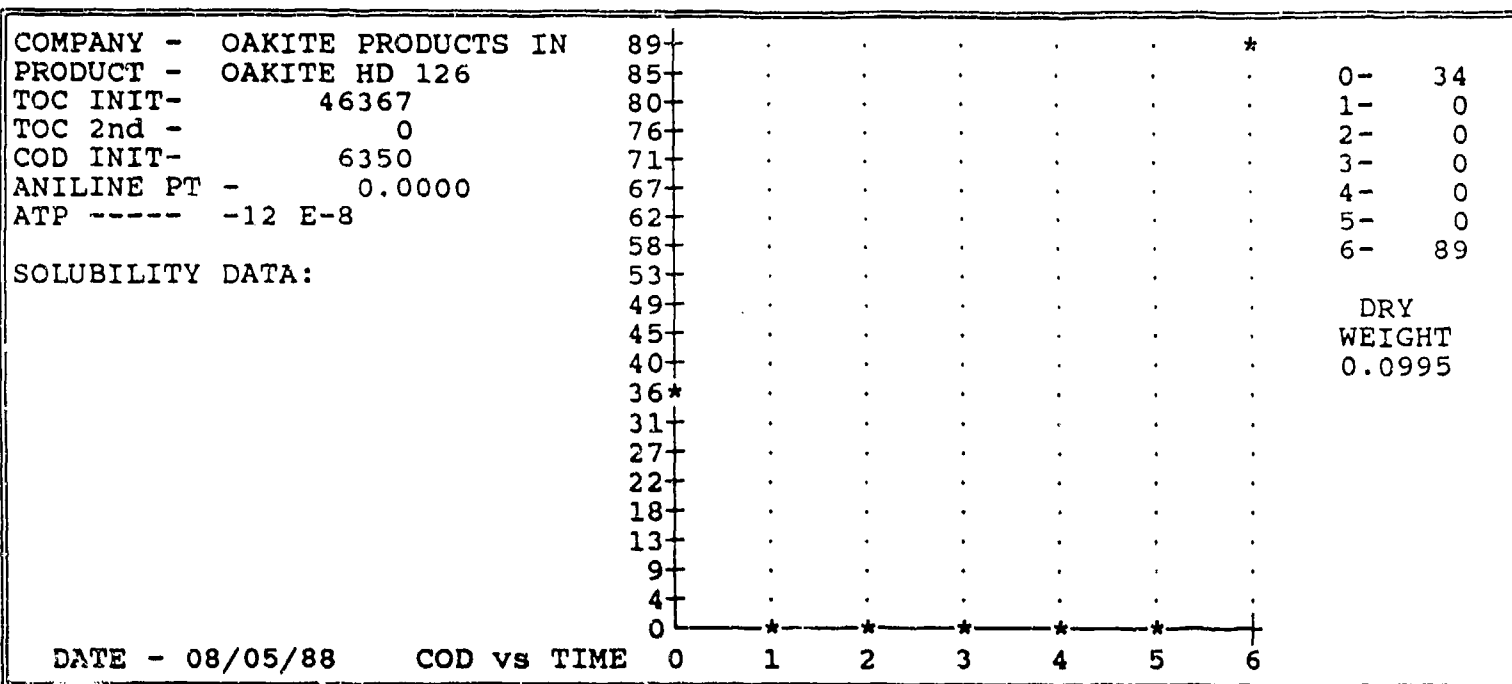
COMPANY - OAKITE PRODUCTS IN	71*	.	.	.	.	.	.	0-	71
PRODUCT - OAKITE DYNADET	67	.	.	.	.	.	.	1-	0
TOC INIT- 69990	64	.	.	.	.	.	.	2-	0
TOC 2nd - 0	60	.	.	.	.	.	.	3-	0
COD INIT- 12000	57	.	.	.	.	.	.	4-	0
ANILINE PT - 0.0000	53	.	.	.	.	.	.	5-	0
ATP ----- 1 E-8	50	.	.	.	.	.	*	6-	50
	46	.	.	.	.	.	.
SOLUBILITY DATA:	43	.	.	.	.	.	.
	39	.	.	.	.	.	.
	36	.	.	.	.	.	.	DRY	
	32	.	.	.	.	.	.	WEIGHT	
	28	.	.	.	.	.	.	0.0995	
	25	.	.	.	.	.	.
	21	.	.	.	.	.	.
	18	.	.	.	.	.	.
	14	.	.	.	.	.	.
	11	.	.	.	.	.	.
	7	.	.	.	.	.	.
	4	.	.	.	.	.	.
	0	*	*	*	*	*	*		

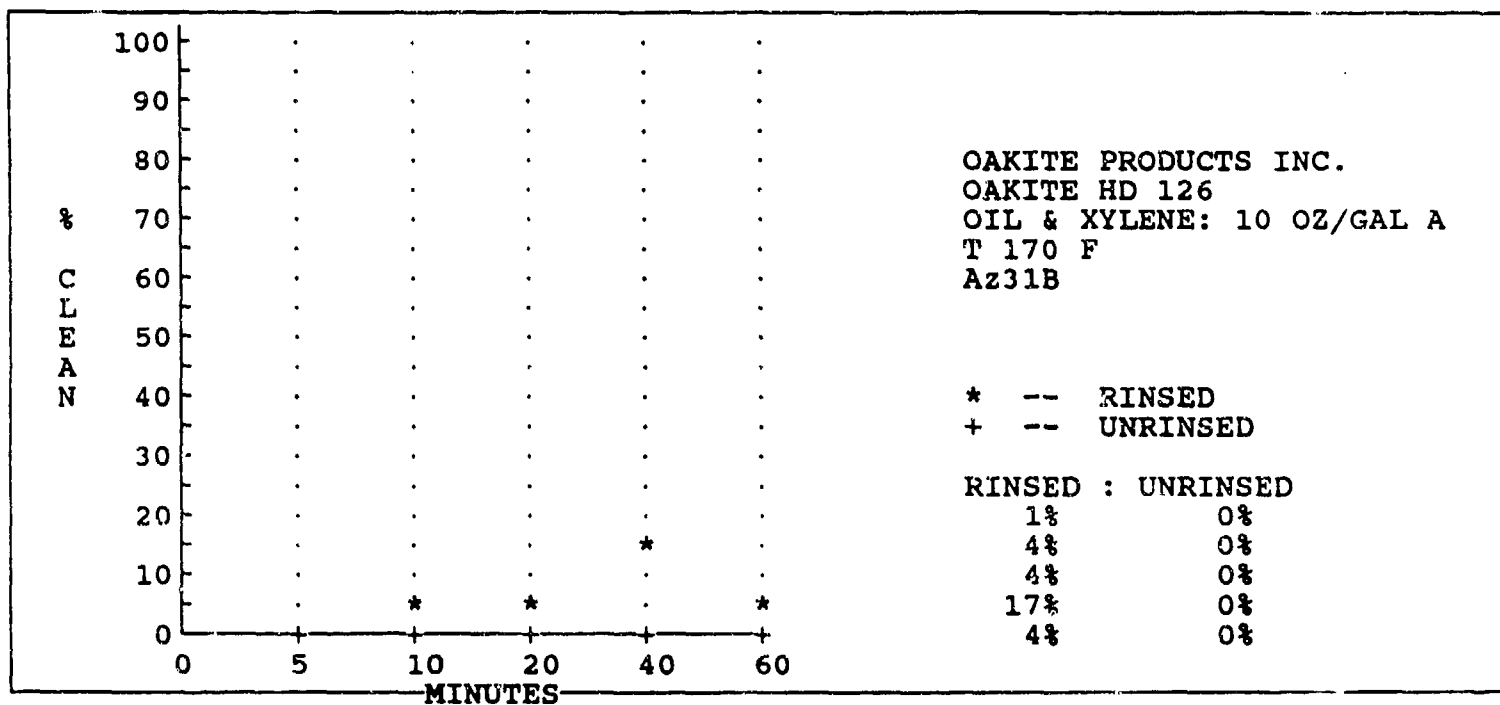
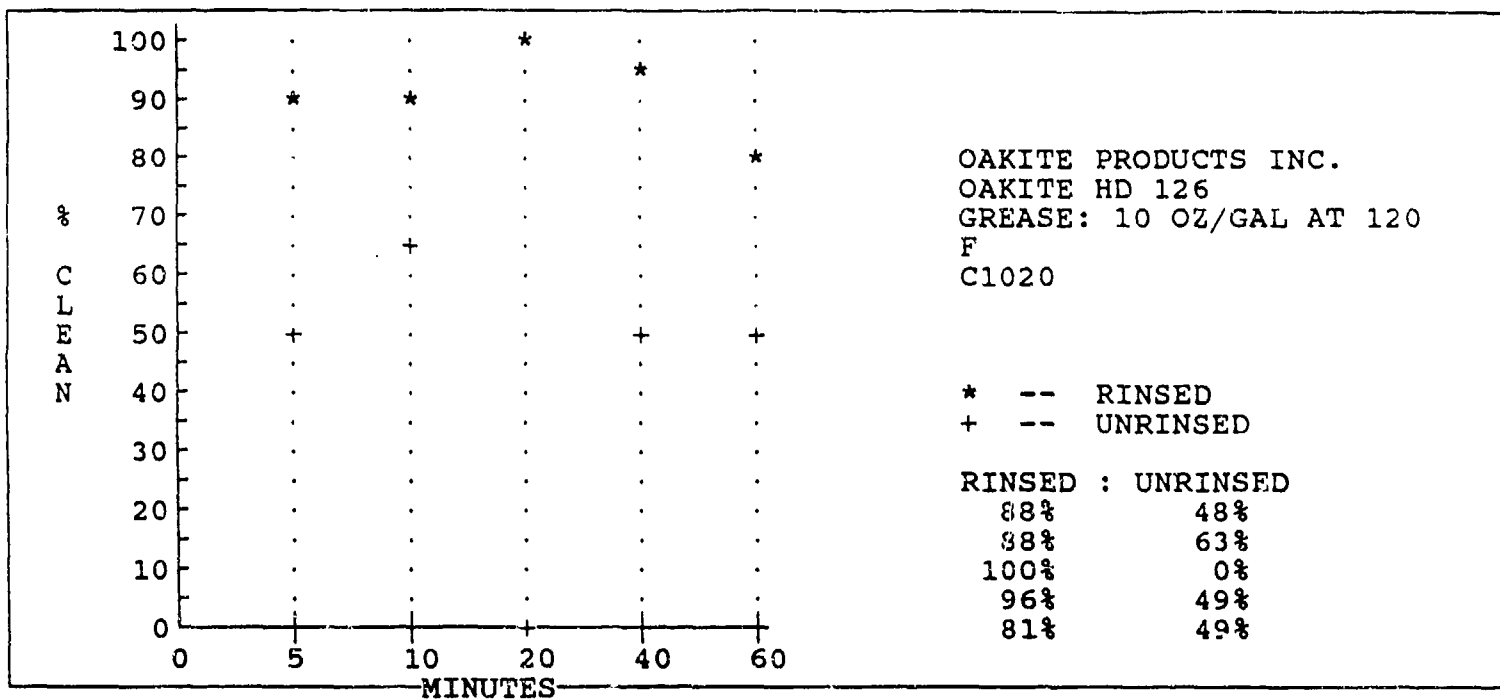
DATE - 08/05/88 COD vs TIME 0 1 2 3 4 5 6

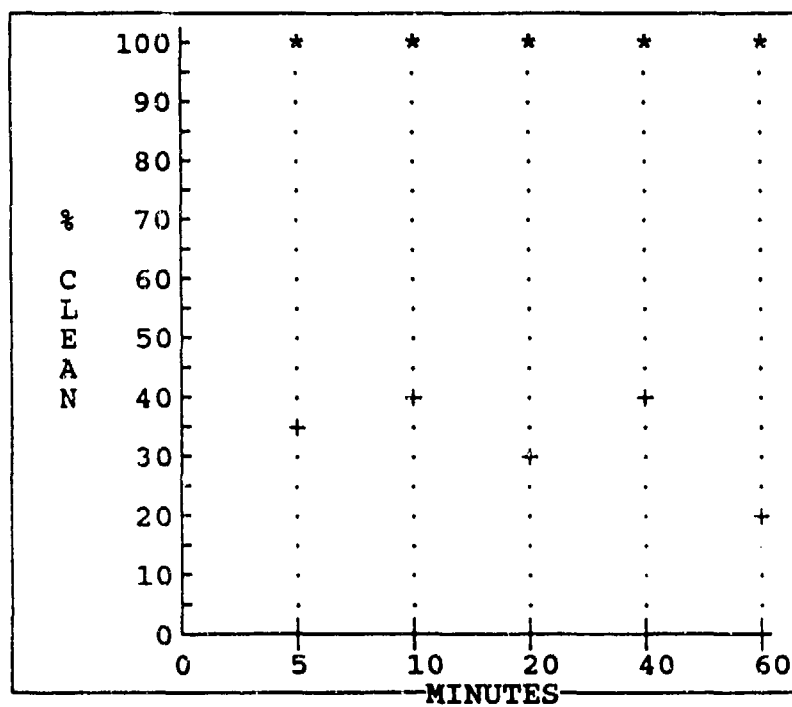
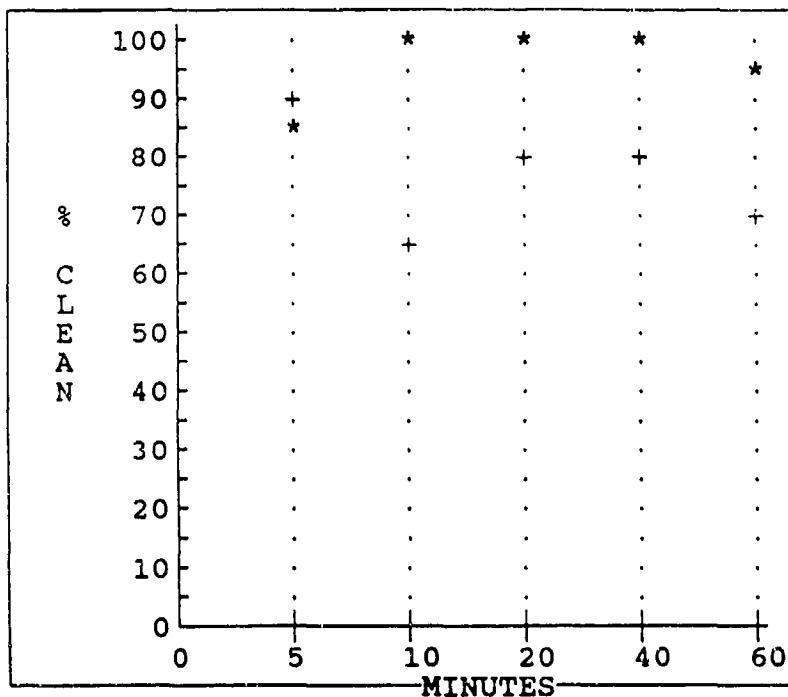
PHENOL	227*	.	.	.	.	.	.	0-	227
08/05/88	216	.	.	.	.	.	.	1-	0
ATP - -72 E-8	204	.	.	.	.	.	.	2-	0
	193	.	.	.	.	.	.	3-	0
	182	.	.	.	.	.	.	4-	0
	170	.	.	.	.	.	.	5-	0
OAKITE PRODUCTS INC.	159	.	.	.	.	.	.	6-	72
OAKITE 162	148	.	.	.	.	.	.
	136	.	.	.	.	.	.
OAKITE PRODUCTS INC.	125	.	.	.	.	.	.	DRY	
OAKITE 2327	114	.	.	.	.	.	.	WEIGHT	
	102	.	.	.	.	.	.	0.0995	
OAKITE PRODUCTS INC.	91	.	.	.	.	.	.
OAKITE 24	79	.	.	.	.	.	.
	68	.	.	.	.	.	*
OAKITE PRODUCTS INC.	57	.	.	.	.	.	.
OAKITE DYNADET	45	.	.	.	.	.	.
	34	.	.	.	.	.	.
OAKITE PRODUCTS INC.	23	.	.	.	.	.	.
OAKITE HD 126	11	.	.	.	.	.	.
	0	*	*	*	*	*	*		

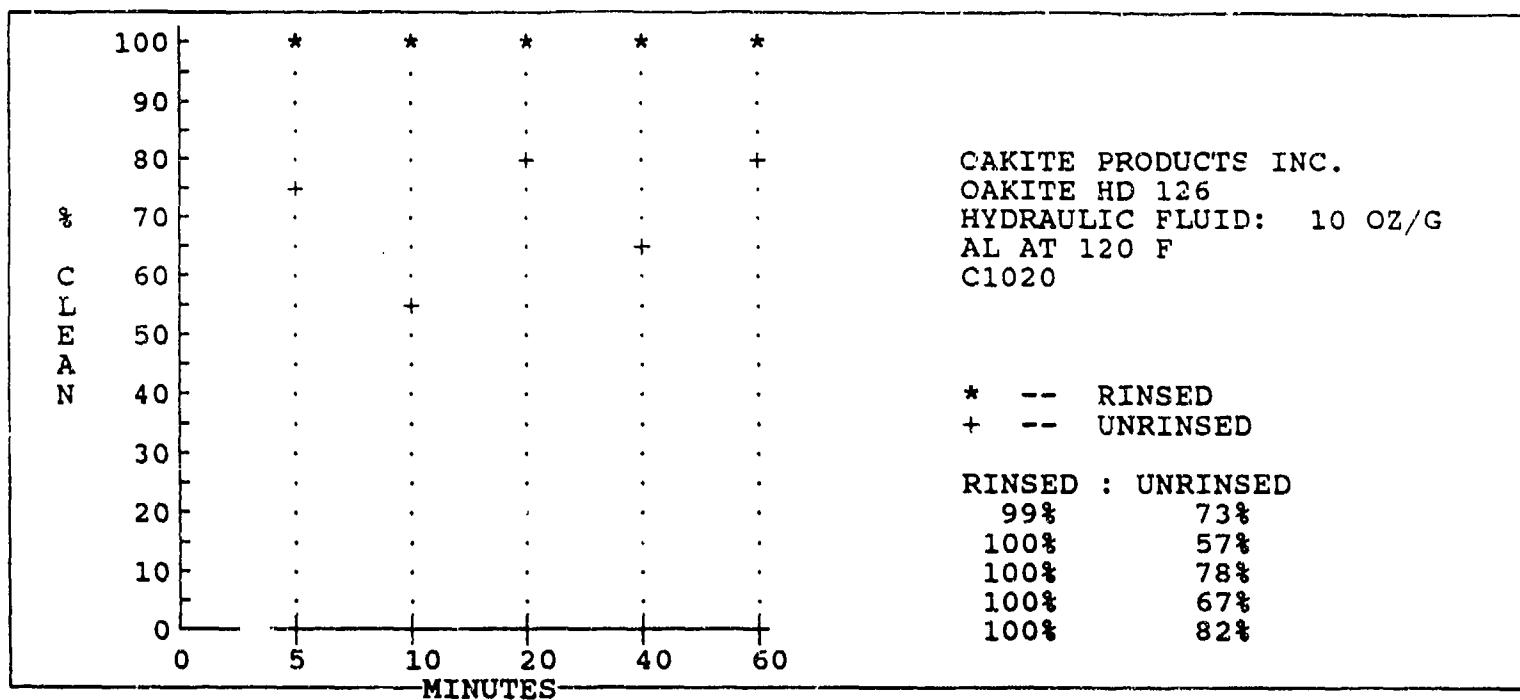
DATE - 08/05/88 COD vs TIME 0 1 2 3 4 5 6

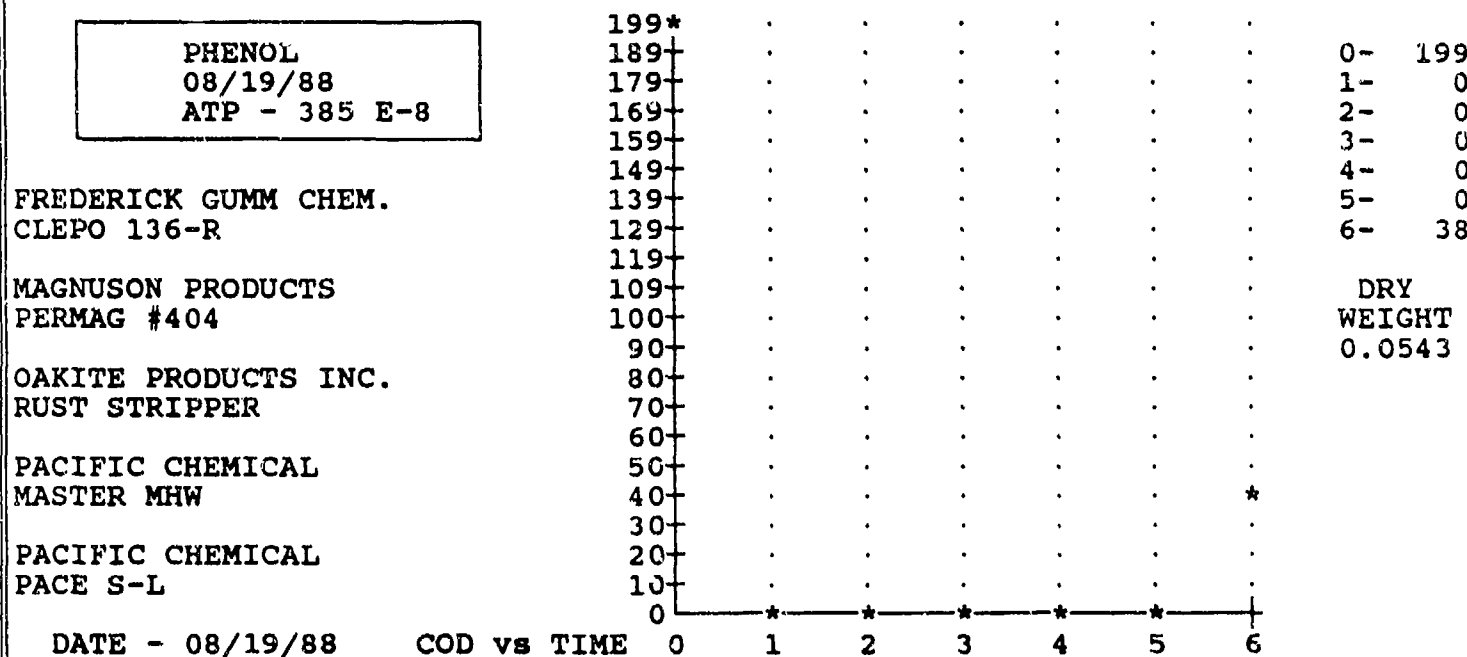
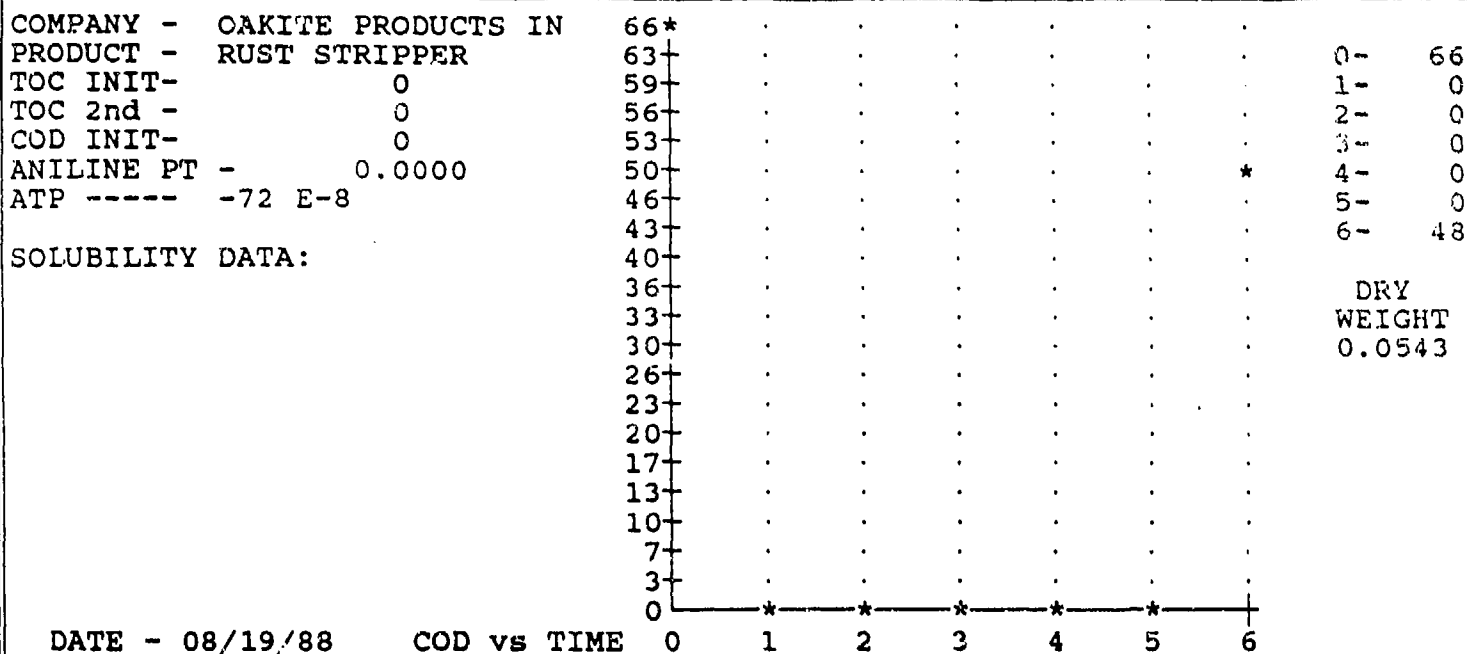












COMPANY -	ORANGE-SOL INCORPE	552*	.	.	.	.	.	.	0-	552
PRODUCT -	DE-SOLV-IT	524	*	.	.	.	.	.	1-	533
TOC INIT-	251425	497	.	.	.	.	.	.	2-	107
TOC 2nd -	0	469	.	.	.	.	.	.	3-	117
COD INIT-	1255000	442	.	.	.	.	.	.	4-	142
ANILINE PT -	0.0000	414	.	.	.	.	.	.	5-	162
ATP -----	9 E-8	386	.	.	.	.	.	.	6-	301
		359	.	.	.	.	.	.
SOLUBILITY DATA:		331	.	.	.	.	.	.
CONCENT @ AMBIE	18%	304	.	.	.	.	.	*	DRY	
CONCENT @ 100	60%	276	.	.	.	.	.	.	WEIGHT	
CONCENT @ 140	99%	248	.	.	.	.	.	.	0.0030	
		221	.	.	.	.	.	.
		193	.	.	.	.	.	.
		166	.	.	.	.	*	.
		138	.	.	.	*	.	.		
		110	.	*	*	.	.	.		
		83	.	.	.	.	.	.
		55	.	.	.	.	.	.
		28	.	.	.	.	.	.
		0	.	.	.	.	.	.

DATE - 02/23/88 COD vs TIME 0 1 2 3 4 5 6

PHENOL 02/23/88 ATP - 34 E-8		254*	.	.	.	.	.	.	0-	254
		241	.	.	.	.	.	.	1-	112
		229	.	.	.	.	.	.	2-	10
		216	.	.	.	.	.	.	3-	16
		203	.	.	.	.	.	.	4-	22
		191	.	.	.	.	.	.	5-	172
ORANGE-SOL INCORPERATED		178	.	.	.	.	*	.	6-	82
DE-SOLV-IT		165	.	.	.	.	.	.
		152	.	.	.	.	.	.
		140	.	.	.	.	.	.
		127	.	.	.	.	.	.
		114	*	.	.	.	.	.	DRY	
		102	.	.	.	.	.	.	WEIGHT	
		89	.	.	.	.	.	.	0.0030	
		76	.	.	.	.	.	*
		64	.	.	.	.	.	.
		51	.	.	.	.	.	.
		38	.	.	.	.	.	.
		25	.	.	.	*	.	.		
		13	.	*	*	.	.	.		
		0	.	.	.	.	.	.

DATE - 02/23/88 COD vs TIME 0 1 2 3 4 5 6

COMPANY - ORANGE-SOL INCORPE	618	.	.	.	*	.	.	
PRODUCT - DE-SOLV-IT	587	*	.	.	.	.	.	0- 160
TOC INIT- 251425	556	.	.	.	.	.	.	1- 584
TOC 2nd - 0	525	.	.	.	.	.	.	2- 60
COD INIT- 1255000	494	.	.	.	.	.	.	3- 66
ANILINE PT - 0.0000	464	.	.	.	.	.	.	4- 618
ATP ----- 47 E-8	433	.	.	.	.	.	.	5- 153
	402	.	.	.	.	.	.	6- 159
SOLUBILITY DATA:	371	.	.	.	.	.	.
CONCENT @ AMBIE 18%	340	.	.	.	.	.	.	DRY
CONCENT @ 100 60%	309	.	.	.	.	.	.	WEIGHT
CONCENT @ 140 99%	278	.	.	.	.	.	.	0.0610
	247	.	.	.	.	.	.
	216	.	.	.	.	.	.
	185	.	.	.	.	.	.
	155*	.	.	.	.	*	*
	124	.	.	.	.	.	.
	93	.	.	.	.	.	.
	62	.	*	*	.	.	.	
	31	.	.	.	.	.	.
	0	.	.	.	.	.	.
DATE - 03/17/88	COD vs TIME	0	1	2	3	4	5	6

PHENOL	292*	.	.	.	.	.	.
03/17/88	277	.	.	.	.	.	.	0- 292
ATP - 60 E-8	263	.	.	.	.	.	.	1- 195
	248	.	.	.	.	.	.	2- 135
	234	.	.	.	.	.	.	3- 46
	219	.	.	.	.	.	.	4- 76
HYLUBE INC.	204	.	.	.	.	.	.	5- 140
HYKLEEN 300	190	*	.	.	.	.	.	6- 32
	175	.	.	.	.	.	.
INTERNATIONAL PRODUCTS CO	161	.	.	.	.	.	.	DRY
MICRO	146	.	.	.	.	*	.	WEIGHT
	131	.	*	.	.	.	.	0.0610
ORANGE-SOL INCORPERATED	117	.	.	.	.	.	.
DE-SOLV-IT	102	.	.	.	.	.	.
	88	.	.	.	.	.	.
PACIFIC CHEMICAL	73	.	.	.	*	.	.	
RIDDALL	58	.	.	.	.	.	.
	44	.	.	*	.	.	.	
PANTHER CHEMICAL CO.	29	.	.	.	.	.	*
759	15	.	.	.	.	.	.
	0	.	.	.	.	.	.
DATE - 03/17/88	COD vs TIME	0	1	2	3	4	5	6

